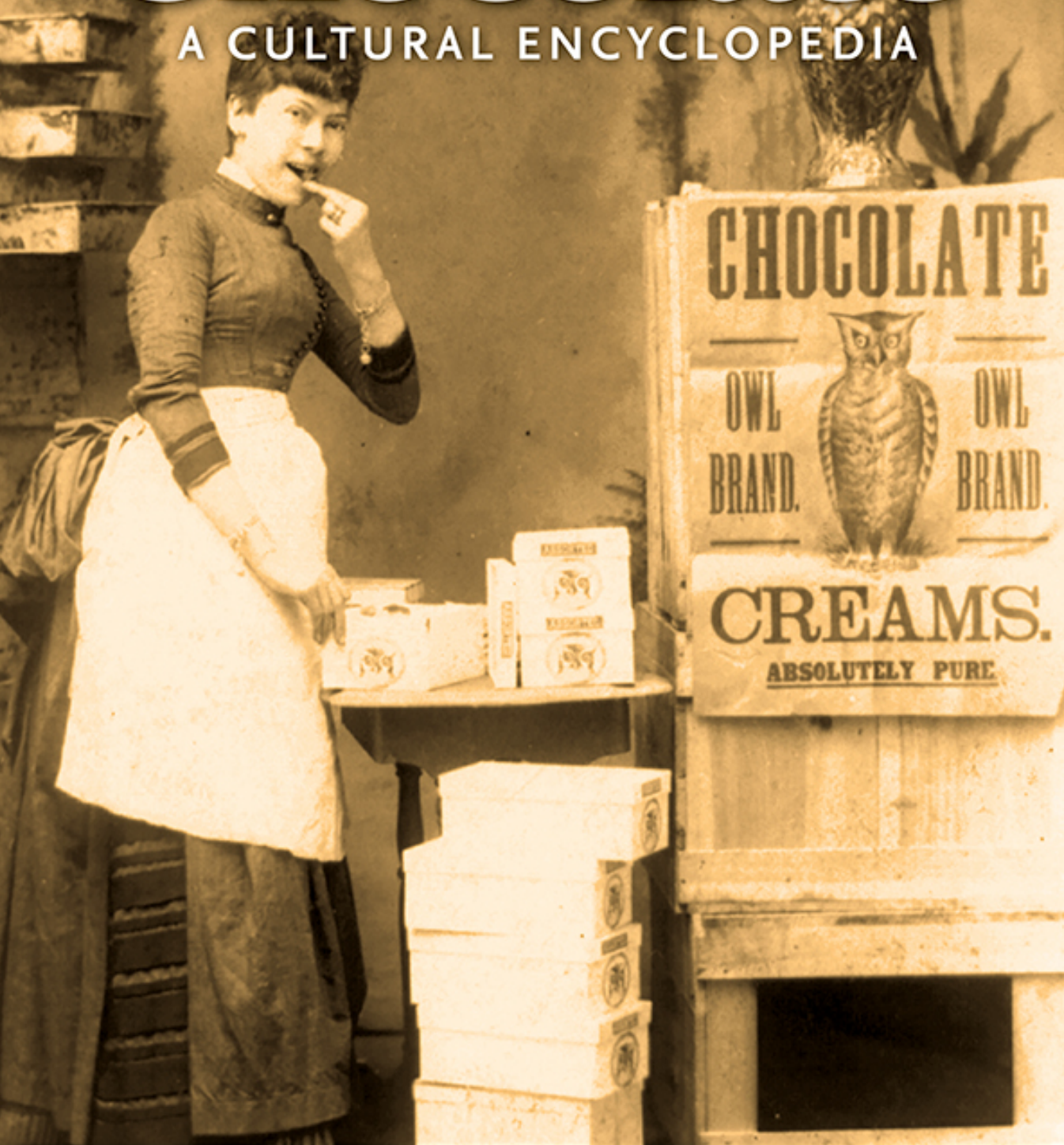


Chocolate

A CULTURAL ENCYCLOPEDIA



ROSS F. COLLINS

Chocolate

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A Cultural Encyclopedia

Ross F. Collins



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Introduction

Probably no food in history has become as enrobed into world culture as chocolate. Its mythical beginnings tell a tale of ancient empires and great kings. The mysterious Olmecs, the mighty Maya; both civilizations grew to tower over Central America, and then fall into ruin, long before the rest of the world knew they existed. The Aztecs had taken power by the time of Columbus. Early Spanish explorers were dumbfounded to discover an entire culture underpinned by an almond-shaped bean natives called *xocolatl*. The food was part of Aztec weddings, funerals, harvests, and human sacrifice. It was a form of currency. It was a drink of the gods, and a drink of an emperor who, purportedly, relied on it for potency during visits to his mistresses. This was probably not literally true. And yet it was mythically true, in the sense that it became the first of a series of fables and tales, usually fascinating, sometimes lurid, often fanciful, that have for centuries surrounded the lore of chocolate.

The first Spanish colonizers in the New World disdained chocolate. At the time, it was usually an unsweetened beverage ritualized in Aztec culture but commonplace in the Maya culture of Mesoamerica. It was presumed to be a medicine, perhaps because it tasted somewhat bitter. But colonizers saw its importance to the natives and realized chocolate could be one answer to the real reason behind colonial conquest: to get rich. In appropriating native customs, the Spanish and Portuguese acquired a taste for chocolate. But they added sugar. That was the first of several European changes that brought this peculiar beverage of the Spanish and Portuguese colonies to eventually adorn the tables of popes and aristocrats throughout Europe.

Chocolate was nearly always consumed as a drink during the first three centuries of its history in the Old World, and for probably two more millennia before that in the Americas. Because the first European occupiers of New World chocolate lands were strongly Catholic, chocolate early on became associated with the Roman Catholic Church. Chocolate culture in the Iberian Peninsula (Spain and Portugal) grew to widespread use among the aristocracy both secular and religious. Catholic Orders such as the Jesuits established extensive cacao operations to pay their taxes to the Crown and to support their missionary work. The pope became familiar with chocolate as valuable gifts from the friars, and his close association with Italian aristocracy likely spread chocolate first to Italy. From

there it moved throughout Europe, probably by way of the Continent's extensive network of Catholic monasteries.

It perhaps moved a bit more slowly into Protestant countries in the north, notably Britain, but by the 1660s coffee and chocolate houses were springing up in most major cities. These served to both introduce the New World beverage and to encourage those who had the means to enjoy it both in the caf  s and at home. By the end of the century, the upper classes had developed customs of chocolate service that included dedicated chocolate sets and sometimes chocolate kitchens. The first European chocolate boom had begun.

Productive cacao grows no more than 20   N or 20   S of the equator. Practically speaking, most of it is harvested in tropical lands no more than 10   N or S. This is far away from Continental Europe. Moreover, cacao seeds, unlike the other exotic beverages coffee and tea, need extensive and fairly exacting processing to make acceptable chocolate. Beans must be fermented and dried on site, then roasted, winnowed, ground into cakes, and prepared with sugar and other substances to make it reasonably attractive to a European or North American palate. In perhaps one of chocolate's most sorrowful legacies, the lands where cacao grows also were the lands of European colonization, coerced labor, and slavery. As natives in the New World died in near-genocidal proportions, Europeans who discovered the profits of cacao farming relied on slaves from West Africa. Plantation-based slaves tended the trees and prepared the beans. Household slaves in North America undertook the grueling process of hand-grinding cocoa nibs into the chocolate enjoyed by the more privileged classes. Slave labor in the cocoa industries did not end until the early twentieth century. It was replaced often with coerced labor and, in recent years, child labor. This ugly underside of a worldwide treat still is part of what we today call the cocoa sector. In 2021, about six million people worldwide toiled on the cacao farms. The U.S. Bureau of International Labor Affairs in 2020 estimated that 1.5 million of them were children, working in sometimes harsh conditions, most of them in Ivory Coast and Ghana.

After the French Revolution and the rise of democratic influence in Europe, the reputation of chocolate, which was associated with privilege and aristocracy, saw the beverage's fortunes eclipsed in most countries by coffee and tea. Chocolate symbolized the old evils of aristocratic privilege; coffee symbolized the modern values of equality. But chocolate's fortunes were hardly over. In fact, they had just begun.

The nineteenth-century invention of chocolate in bar form marked the beginning of a second chocolate boom. It was no longer almost exclusively a drink that was messy to prepare, time-consuming to serve, and rather expensive to consume. Chocolate could now be purchased at any newspaper kiosk or rail station. It offered quick energy, a fast snack for an industrializing labor force on the go. An ideal pick-me-up for workers. No more need for hoity-toity chocolate sets. Chocolate for the masses! Once an artisanal pursuit, chocolate manufacturing grew into a large-scale industry with potential for enormous profit. Cadbury, Fry, Rowntree, Baker, Menier, Cailler, Van Houten, and Stollwerck were among famous early names that grew to dominate the industry during this century. Some of their advertising emphasized a newfound interest in food purity. Appeals depicting children and

wholesome surroundings helped to develop standards of modern marketing as mass-circulation newspapers and full-color poster-based appeals grew to dominate urban daily life.

Challenges to chocolate's culinary ascendancy remained. At the beginning of the nineteenth century, it still tasted somewhat fatty, bitter, and gritty. A revolution in preparation, along with the introduction of bar chocolate, also included a chocolate press to remove some of the fat, alkalizing treatment to remove some of the bitterness, and a mechanical grinder to remove some of the grittiness. And then, in the 1870s, a third revolution turned chocolate into the ubiquitous treat it is today. Daniel Peter in Switzerland spent years trying to formulate milk chocolate in bar form. A neighbor, Henri Nestlé, suggested he try powdered milk used in the infant formula that had built the Nestlé empire. It worked. At about the same time, Swiss chocolatier Rodolphe Lindt's conching invention produced a smoother, more appealing product. By 1900, Swiss milk chocolate dominated the industry, launching a third chocolate boom.

In the early twentieth century, big companies such as Cadbury in England scrambled to introduce milk chocolate bars able to compete with the Swiss. Cadbury's Dairy Milk became the standard to meet outside of Swiss recipes. Milton Hershey after visiting the Chicago World's Fair became convinced that the future for confectionary manufacturing lay in chocolate. He sold his caramel company and worked to perfect his own kind of milk chocolate formula, one that could be made using modern techniques of mass production. Sometimes called "The Henry Ford of chocolate," Hershey introduced an inexpensive milk chocolate bar for everyone in 1905. His five-cent Hershey Bar saw explosive American success.

The more bitter dark chocolate fell out of favor among retail manufacturers who persuaded an admiring public that "chocolate" almost by definition was milk chocolate. Hershey's advertising emphasized the wholesomeness of a snack containing real milk. The on-again, off-again pursuit of chocolate as a health food roared back to the side of the optimists.

The golden age of the chocolate candy bar in the 1920s and 1930s saw the introduction of most snack bars that consumers find familiar today. Mars introduced the Milky Way in the United States and Mars Bar in England. Nestlé introduced the Crunch bar. Rowntree introduced KitKat. Competition in milk chocolate confections eclipsed some of the older chocolate powerhouses while introducing new ones. Chocolate became a coveted part of soldier kits in World War I. Before World War II, the U.S. military asked big chocolate makers to formulate chocolate rations for emergency use and snacking. In 1941, Mars introduced M&M's, a candy-coated milk chocolate able to stand up better to heat. After the war, the heavily advertised sweet propelled Mars toward becoming the largest chocolate maker in the United States. In 2021, Mars was the largest chocolate maker in the world.

But the twentieth-century chocolate boom based on milk chocolate began on a dark note. Chocolate still came from the colonial world around the equator. And, despite a global promise to end slavery, some cacao plantation workers remained enslaved, or close to it. Investigations by muckraking reporters and Cadbury's own agent revealed that the Chocolate Islands, a Portuguese colony that in the

early century produced most of the world's supply, was still relying on coerced labor from Angola. Most were in effect slaves. Promises to reform appeared to improve their lot, but renewed investigations in the 1920s still indicated coerced labor in cacao farming.

The high-flying reputation of chocolate took another dive after World War II, as the presumption that it could be a healthy food was swinging again to the negative. Nutritionists observed that most mass-market milk chocolate actually included not a lot of real chocolate, but a whole lot of sugar. Sugar usually was the first thing on the ingredient list. And chocolate had become the treat of choice for children. Nutritionists blamed sugary milk chocolate not only for tooth decay but also for gum disease, obesity, and generally an unhealthy life style. Its mildly stimulating effect from theobromine also was a concern to some. Parents pledged to reduce chocolate consumption for themselves as well as for their children—or they talked about reducing it. But the big manufacturers were hardly going out of business.

In the 1970s, some health-conscious suppliers made an effort to find an alternative treat. They proposed carob, a bean known in the Mediterranean since biblical times. But few found it an acceptable substitute. Children did not like it. The truth that everyone knew was this: nothing else in the world tastes like chocolate.

The pendulum swung back toward the end of the 1980s. Researchers began taking a serious look at chocolate's possible health benefits, for the first time bringing modern scientific methods to cocoa research. What they found showed promise. Chocolate's high level of flavanols could provide a protective antioxidant effect. The benefit, however, did not appear to extend to milk chocolate. This offered one encouragement toward a 1990s explosion of small chocolate makers who brought back the complex tastes of dark chocolate carefully prepared. The growth of fine chocolate as presumed health food was twinned with emergence of small operators who promised to address what had now become a centuries-old challenge: how to produce a world-favorite food without exploiting the labor that harvested the beans behind it. Slavery by 2000 was thought long eradicated from the cocoa sector. An investigation by BBC journalists, however, found that it apparently still existed among child laborers in West Africa. And while by then no colonial overlords were dictating labor practices, cacao farmers in much of the world still lived in poverty. Some authorities also allowed exploitation of the rain-forest to grow more and more cacao. The big multinationals both at the retail and wholesale levels promised to do their part in an attempt to push poverty, child labor, and environmental damage out of the cocoa sector. As of 2021, the efforts had shown some success, but abuses remained widespread.

Enormous consolidation by the early twenty-first century squeezed “big candy,” as the world's top manufacturers are sometimes nicknamed, into just a handful of multinational manufacturers and processors. At the other end, small so-called bean-to-bar operators have grown in popularity, and the fine chocolate that for decades was difficult to find was now available even at some grocery stores and service stations. People perceived dark chocolate as being healthy. But research by the 2010s again was pushing the pendulum back, calling into question the beneficial impact to overall health of a few pieces of chocolate. In any case, in 2021, the

industry itself continued to be healthy, profitable, and growing. Whether it would be sustainable facing climate change still was an open question.

This book joins five centuries of writings on chocolate, enough to undoubtedly fill a good-sized school library. The author and contributors have tried to examine legends, folklore, and modern claims based on the most recent research, and in some cases, have returned to original documents and evidence from centuries ago. Work is based on a bibliography of about five hundred sources. In-text references are included for those who want to evaluate the research. The book aims to be reasonably complete, but is written for a general audience, and so may not cover all details on specific topics. Readers who would like to know more can consult the reference lists at the end of each chapter and alphabetical entry. The alphabetical entries, comprising eighty short articles, delve into more detail and cover more topics, while the longer chapters sketch a more general picture.

—Ross F. Collins
August 2021

Chocolate Chronology

8000 BC–2000 BC

Cacao tree originates in the Amazon basin in Ecuador.

ca. 3,500 BC

Ceramic pots in Ecuador discovered with traces of theobromine, a marker for cacao.

1900 BC–1500 BC

Early use of cacao traced to Chiapas state in Mexico, based on pottery residue.

1500 BC

Evidence that the Olmecs in Mesoamerica are first to consume chocolate as a drink.

AD 450

Evidence of cocoa used in sauces in the region of modern Honduras.

AD 250–900

Maya civilization living in modern Guatemala and surrounding area inherit chocolate culture from their Olmec neighbors, expand its use and cultural significance.

1100–1125

Cacao tree reaches New Mexico, North America.

1300–1519

Aztec civilization grows to dominate Mesoamerica from its capital of Tenochtitlán, modern Mexico City. Cocoa becomes so important to its culture that the empire conquers the cacao-growing area of Soconusco, in modern Chiapas state, for cocoa bean tribute.

1492

Legend that Columbus bought cocoa beans back to Spain from his first voyage, but nibs were mistaken for goat dung and thrown out. No evidence can be found to support this story.

1500–1510

A number of Jews from Portugal and Spain immigrate to southern France fleeing the Inquisition. The majority assimilate into French society and do not continue to follow Judaism. Legend indicates that they brought chocolate to Bayonne from Portugal, and from there to the rest of Europe. While Bayonne has long been a

center of chocolate manufacture, no evidence can be found for chocolate existing there at this early date.

1502

On his fourth voyage to the New World, Columbus and his son Ferdinand encounter “almonds,” which Maya used for money, according to an account from his son. No evidence, however, can be found indicating Columbus either tried chocolate or brought the beans back to Spain.

1503

The Spanish Crown grants the first *encomiendas* to conquerors, effectively establishing slavery in New World cacao plantations.

1519

Spanish conqueror Hernán Cortés writes to emperor Charles V to report he had been given a grant of land with a cacao plantation of two thousand trees, noting the seed was used as money throughout the New World.

1521

Fall of the Aztec Empire at Tenochtitlán.

1528

Legend that Cortés brought chocolate to Spanish king Charles V, and from there it became popular in Spanish court. However, there is no evidence for this nor is there indication of cacao on lists of Cortés’s shipments of 1519 or 1528 from New World.

1529

Spanish Franciscan friar Bernardino de Sahagún sails for the New World. He would compile one of the most authoritative early reference texts on native chocolate culture.

1532

First reference in French for cacao, a French translation of a Latin account by Milan writer Pietro Martire d’Anghiera, about Spanish explorations. Includes reference to “cacap,” which may be a typo, indicating it is a fruit similar to almonds.

1534

Jesuit order founded. It becomes a major cacao grower in colonial Brazil.

1537

Papal bull (decree) forbids enslavement of Native American peoples but not Africans.

1544

A delegation of nobles from Kekchi Maya of modern Belize visit Prince Philip of Spain as guests of Dominican friars. Chocolate is listed as one of the gifts they bring, described as “receptacles of beaten chocolate.”

1552

Badianus Manuscript, written by two Aztec natives, is published. It is a “herbal” that includes the earliest extensive discussion of cocoa for native medicinal use.

The manuscript was unknown to the medical world until its 1929 rediscovery in the Vatican Library.

1577

Doctor and botanist Francisco Hernández, Spanish king Philip II's physician, returns from the New World with extensive records and illustrations of plants and animals. He considers the use of chocolate in connection with Galenic (humoral) medicine. However, his papers are deposited in a library and not rediscovered until 1603.

Bernardino de Sahagún publishes his 2,400-page *Historia General de las Cosas de Nueva España*; the history is unknown outside Spain until cataloging in 1793.

1579

Spanish physician Augustín Farfán publishes *Brief Treatise on Medicine*; recommends chocolate for several medical conditions.

1585

First verified shipment of cacao from Veracruz to Seville, Spain.

1590

First use of the word “chocolate” in the modern spelling appears in an account by Joseph de Acosta.

1591

Juan de Cárdenas publishes *Problems and Secret Marvels of the Indies* (original in Spanish). As a physician, he analyzes health properties of chocolate using the Galenic medical system of the day.

1606

Italian adventurer Francesco d'Antonio Carletti describes chocolate in a report given to Ferdinando I de Medici in Florence. It includes a detailed description of cacao growing and chocolate making. Some historians cite this as the first source bringing chocolate to the attention of Europe outside Spain.

1615

Legend that chocolate was brought to France by fourteen-year-old María Teresa as a gift for marriage to Louis XIII. The story is likely false; it traces to nineteenth-century French culinary author Brillat-Savarin, who offered no evidence, though the legend has been repeated in many sources from the 1800s until the present.

1618

Spanish physician Bartolomeo Marradon writes a dialogue to summarize different uses and additives of cocoa in Spain but warns that chocolate is potentially “obstructive.” Colmenero refers to Marradon as a target for disagreement, arguing in 1631 that chocolate is beneficial and fits into the Galenic medical system.

1631

Antonio Colmenero de Ledesma, a Spanish physician, publishes influential treatise on chocolate. His book is widely translated and circulated throughout Europe.

1640

Colmenero's work translated into English.

1641

First documented evidence of cocoa beans arriving to North American colonies, to St. Augustine, then the capital of La Florida.

1643

René Moreau, relative of Colmenero and Paris director of faculty of medicine, translates with annotations Ledesma's book. The material is part of Philippe Sylvestre Dufour's 1671 *De l'usage du caphé, du thé et du chocolat*.

1644

Colmenero's book translated into Latin, the language of medicine at the time.

1648

Thomas Gage in England publishes an account of chocolate, shows awareness of Colmenero's text.

1656

First reference to chocolate in French newspaper, Renaudot's *La Gazette* (Paris) describes Spanish making a beverage "they call chocolate."

1660

French king Louis XIV marries Marie Thérèse of Spain. Her retinue from Spain are chocolate drinkers; purportedly she takes her chocolate in secret as her husband does not approve, though her habit is widely known among the king's court.

1662

Italian cardinal Francesco Maria Brancaccio writes a dissertation regarding chocolate and fasting; declares that drinking chocolate will not break the Catholic fast, long a debate among religious authorities, but only if drunk for medical reasons.

Physician and scholar Henry Stubbe in England publishes the first whole book written in English on chocolate, *The Indian Nectar; or a Discourse Concerning Chocolata*.

1663

Cardinal Mazarin of Italy succeeds Richelieu as French minister, brings two cooks from Italy to prepare coffee, tea, and chocolate.

1668

Chocolate as a beverage introduced to Florence, according to a contemporary report of two doctors.

ca. 1670

François Procope (from Sicily) introduces coffee, tea, and chocolate to general Paris outside of the court and clergy.

1672

William Hughes publishes *The American Physitian; Or, A Treatise Of The Roots, Plants, Trees, Shrubs, Fruit, Herbs, &c. Growing in the English Plantations in*

America in London, includes description of chocolate production and preparation based on the author's New World experience and Spanish-language authors.

1691

First reference in France of chocolate used in food, a savory poultry dish with chocolate sauce, bringing chocolate away from its exclusive use as a beverage.

1693 (some sources say 1694)

White's Chocolate House opens in London, founded by Italian immigrant Francesco Bianchi, who in England adopts the name Francis White.

1730

Benjamin Franklin sells chocolate in his shop in Philadelphia.

1753

Carl Linnaeus names the cacao tree *Theobroma cacao*, "food of the gods."

1759

Jesuits expelled from Portugal and its colonies, including Brazil, ending the order's production of cacao.

1765

Physician James Baker and chocolate maker John Hannon open one of the world's first chocolate factories using power machinery, in Dorchester, Massachusetts. Baker Chocolate still existed in 2021, one of the world's oldest brand names.

1785

Marquis de Sade writes of men taking chocolate before an orgy; scholars consider story apocryphal.

1795

Quaker Joseph Fry of Bristol, England, uses steam engine to grind cocoa beans.

1800

Sulpice Debauve and his nephew, Jean-Baptiste Auguste Gallais, join to establish a chocolate shop in Paris; Debauve & Gallais still existed in 2021 selling high-end chocolate.

1819

François-Louis Cailler chocolate factory opens in Switzerland. Cailler in 2021 was the oldest Swiss chocolate brand still in existence, owned by Nestlé.

1824

Quaker John Cadbury opens shop to sell chocolate in Birmingham, England.

1826

Swiss chocolate maker Philippe Suchard invents the first melangeur to grind cocoa nibs into chocolate liquor.

1828

Coenraad Johannes Van Houten in Holland develops a new alkalizing process called Dutching, to produce a milder flavor, darker appearance, and better ability to mix with liquids. In addition to Dutching, Van Houten develops the cocoa press

to remove some of the cocoa butter from the chocolate mass to produce a cocoa powder.

1830

Menier establishes first mechanized factory in France to produce cocoa powder.

1847

Fry's Chocolate, Bristol, relies on Van Houten's process to produce the first chocolate in bar form, marking the end of chocolate as nearly exclusively a beverage.

1879

Swiss entrepreneur Daniel Peter uses Henry Nestlé's powdered milk to develop first bar of milk chocolate.

Rodolphe Lindt of Switzerland develops conching, agitating the chocolate for a more mellow and smooth product.

1888

Slavery is abolished in Brazil, the last country in the Western Hemisphere to do so, ending nearly four hundred years of slavery in Central and South American cacao production.

1894

Milton Snavely Hershey opens the Hershey Chocolate Company in Derry Church, Pennsylvania.

1905

Cadbury's Dairy Milk bar introduced in Britain.

Hershey's introduces the five-cent Hershey Bar.

1905–1907

Working for Cadbury, Joseph Burt travels to the West African islands of São Tomé and Príncipe to investigate reports of modern slavery in cacao plantations.

1907

Hershey introduces its chocolate kiss, borrowing an idea from the Lititz Wilbur Chocolate Factory, which sues unsuccessfully.

1913

São Tomé and Príncipe, Africa's second smallest country, becomes the world's largest producer of cacao, nicknamed the Chocolate Islands.

1923

Mars Co. launches Milky Way bar.

1930

Mars launches Snickers bar.

1938

Nestlé introduces Nestlé's Crunch bar.

1941

Mars introduces M&M's, available only to the military until after World War II ends in 1945.

1944

U.S. troops on D-Day invasion of France carry chocolate as part of emergency rations.

1947

Children in British Columbia, Canada, begin "chocolate bar strike" to protest price increase from five cents to eight cents. It spreads to the entire country. Boycott fails after newspaper falsely reports strike orchestrated by Communist Party.

1969

Researchers begin studying chocolate as a contributing factor to childhood acne, concerning many parents. Most later studies fail to find link.

1973

International Cocoa Organization (ICCO) established in Abidjan, Ivory Coast, to monitor sustainable cacao initiatives and publish industry statistics.

1996

Robert Steinberg and John Scharffenberger open Scharffen Berger Chocolate in San Francisco Bay Area, coining the term "bean-to-bar," and launching the U.S. fine chocolate revolution.

2002

U.S. government encourages coco (for cocaine) farmers in Peru and Columbia to substitute fast-growing CCN-51 strain of cacao.

2008

The three old classifications of cacao, criollo, forastero, and Trinitario, are reclassified based on DNA research.

2009

Nacional cacao, an ancient variety thought to be extinct, is discovered growing wild in Marañón Canyon, Peru.

2012

Heirloom Cacao Preservation Initiative established.

2019

Top cocoa-producing country is Ivory Coast, 1,448,992 metric tons; second is Ghana, 835,466; third, Indonesia, 777,500; fourth, Nigeria, 367,000.

2021

World's largest chocolate manufacturer is Mars Wrigley (USA); world's largest cocoa processor is Barry Callebaut (Switzerland).

Natural History of Cacao

Many of us who live in temperate countries know a little bit about where our food comes from and how it is processed. We may presume we can bring that knowledge to an understanding of cultivation for cacao. But agriculture in tropical lands dramatically differs from farming in more temperate ones. And so those who grow *Theobroma cacao* approach their work in a considerably different manner.

The smallish cacao tree grows naturally to about 12–15 meters (39–49 ft.). It is usually kept at about 7 meters, the size of an apple tree, to make harvesting easier. It is persnickety. It will bear fruit if grown no farther than about 20° from the equator. It wants humidity and moisture all year around, with an annual rainfall of about 180 centimeters (70 in.) and average temperature about 27°C (80°F), with moist ground, usually near rivers. It likes messy surroundings, ideally the decaying vegetation of a rainforest floor. For farmers who prefer neat rows and easy cultivation, the cacao tree is hardly cooperative. Preferred shade trees for cacao include coconut palms, kola, rubber, or mango in Africa and mahogany, bucare, or raintree (monkey pod) in Latin America. The mix of trees and plants encourage midges (and possibly other insects) that pollinate the tree (Beckett 2000; McNeil 2006; Presilla 2009).

Trees begin to bear pods in about two to three years. It takes seven or eight for a full yield. The trees can survive for two centuries, but their principal pod-bearing years are limited to about twenty-five. While a tree can produce at up to seventy-five years old, most of the time the older trees are cloned for consistent production and cut down (Lehnardt 2016).

The seed-bearing cacao pod is about 10–35 centimeters (4–14 in.) long, weighing 200 grams to 1 kilo (2.2 lb.). The cherelles, tiny green pods, require five to six months to ripen, but a mature cacao tree produces cherelles continually and so harvest is available throughout the year, unlike most crops that are harvested by season.

Note we call the tree *cacao* and the pod a *cocoa* pod. Why do we use different terminology to identify cacao in different stages of growth and processing? The

answer is not simple, as the world of chocolate does not agree. We can reduce our descriptions to three words: cacao, cocoa, and chocolate. The tree, everyone agrees, is cacao. The word is based on pre-Columbian identification and became part of Linnaeus's 1753 classification *Theobroma cacao*.

But we don't consume "cacao." We consume chocolate or possibly cocoa. The industry generally calls any product from the cacao tree "cocoa." Its trade group, the World Cocoa Foundation, represents about 80 percent of global manufacturers and cacao-producing countries. But while we have generally adopted the term, it actually is not related to the original name for the food produced by the cacao tree. It may have simply been based on a centuries-old typographical error for cacao, although it seems more likely it actually was a made-up term to identify the Dutch Process that revolutionized production in the early nineteenth century. The powder that was produced was called cocoa. As it became an industry standard, the word became synonymous with any level of cacao production from pod to hot cocoa in your mug. Chocolate, a variation of a term dating from ancient Mesoamerica, can substitute for cocoa as an end product. You can drink hot chocolate or hot cocoa. But it is not generally an industry term. It is a term for professionals who make chocolate confections, such as pastry chefs or chocolate specialty shops. The Fine Chocolate Industry Association represents those at this level who promote use of high-quality chocolate. But some of those may also refer to products with the word "cocoa" or even "cacao" (World Cocoa Foundation n.d.; Fine Chocolate Industry Association n.d.).

To clarify, this book follows the lead of several cacao experts by beginning with the pods just snipped off the tree. These we call cacao pods. The pods, often a dark purple but turning orangish when ripe, contain twenty to fifty seeds in a whitish pulp. The sweet pulp can be eaten immediately as a snack, made into a jam, or fermented as a mildly alcoholic beverage. Researchers surmise that the ancient natives who first encountered cacao pods were attracted to the pulp, as raw seeds are bitter and virtually inedible (Cargill n.d.; McClure 2008; Fiegl 2008; Gordon 2007).

Sometime at the dawn of Mesoamerican history at least 1,500 years ago, someone must have discovered an old pod in which the seeds had fermented. Perhaps the pod was thrown into a fire. The seeds produced a somewhat agreeable aroma, and so curious natives pulled them out, tried crushing them, tried mixing corn into them, and discovered a whole new taste experience.

The seeds direct from the pod need at the least fermenting to bring out the flavor and reduce the astringency. Fermenting briefly sprouts the seeds, then generates heat to stop the germination process. At this point, the seed becomes a bean. And so, as it is no longer viable, from now on through the rest of the process we will call it cocoa or chocolate as a synonym. The worldwide industry itself is called the cocoa sector.

The shady rainforest canopy that cacao trees prefer is ideal for ecologically sound farming. In much of the world, clear-cutting for industrialized farming and ranching threatens the rainforest (BBC Documentary 2013). That is also a concern for cacao, but the best cacao farming practices encourage the opposite. Most successful farmers today are smallholders who sprinkle the trees under the rainforest

canopy, the detritus of the forest floor serving as a natural fertilizer. But it is not only the nature of the rotting plant material itself that cacao trees like. It is what rises up from that—the midges.

The chocolate midge is hardly bigger than the period of this sentence. It is the sole pollinator of the cacao tree, arising from the forest floor to feed on nectar from the small white or pinkish flowers that grow in profusion from pads on cacao tree trunks. Cacao trees produce 50,000–100,000 blossoms a year, but few become pods, as midges only pollinate about three of one thousand (Cargill n.d.; National Park Service n.d.). The midge comprises a number of species, including the tiny scourge of Europe and North America that bites but does not show itself to easily swat. “No-see-ums” North American natives called them. But without them, we would not have the quick energy of a chocolate bar available for our wilderness canoe trip.

The importance of midges to pollinate cacao blossoms was not originally understood. Farmers accustomed to field-based agriculture tamed wild cacao trees into neatly separated rows in plantations. But production deteriorated. Midges do not like dry, open fields and clean ground. Growing large-scale cacao production that eliminates the rainforest also serves to reduce midge population. While three in one thousand may be pollinated in a rainforest, in open cultivation it drops to about 0.3 per thousand (McAlister 2017).

Presuming successful pollination, however, little pods appear on cauliflory, small cushions growing from the trunk and some branches. To early Europeans not used to tropical tree production, the idea of flowers and pods growing right out of a trunk was so peculiar that early sketches showed the cacao trees as the European standard thought they should be: pods growing from branches like cherries. But that was custom over fact. The evolutionary purpose for fruit growing directly from the trunk is uncertain, although possibly the heavy pods could not be easily supported by the branches. As the pollinating midges come from the ground debris, it also is possible that blossoms nearer the ground would more likely be pollinated. Recent research indicates other unknown insects may aid in pollination (Shoemaker 2021).

For pod harvest, care must be taken to avoid damage to the tree or cauliflory. The tree cannot be climbed. The pod is usually cut away from the cauliflory with a machete. The same machete often opens the pod, the seeds nestled in their thick white pulp (Cargill n.d.; Whoriskey and Siegel 2019).

Seeds must be fermented and dried on site to tame astringency and develop flavor. Directly after fermentation (unroasted), they do not taste much like chocolate, though serious health foodies who demand the highest possible antioxidant content can buy dry unroasted nibs (broken beans). Unfermented beans for consumption are uncommon, as they are not palatable. Some researchers contend that it is nearly impossible to keep the beans completely raw (never above 38°C, 100°F) during processing and drying required to avoid moldy, spoiled beans (Giller 2017).

To begin the fermentation, after harvest seeds are piled normally in wooden pens and covered with leaves for about five days depending on variety (less time for high-quality Criollo). Fermentation raises the heat to about 50°C (122°F), necessary to lower astringency and begin to develop chocolate flavor. The pulp melts

away as acetic acid (vinegar) while a series of chemical reactions turns the complex proteins and sugars into simpler sugars and amino acids. The cacao seeds, turning brown, will no longer grow and so have become cocoa beans.

Variations in the fermentation temperature, length of time at a particular temperature, length of fermentation, and oxygen present during the aerobic portion of fermentation will have a significant effect on the quality of the bean (Gordon 2007).

After fermentation, the beans must be dried to avoid mold during shipping. Usually, they are dried about a week in the sun, but some cloudy, humid climates prevent that, and so they are dried over wood fires. Care is taken to avoid imparting a smoky flavor to the beans, called “hammy” in the industry. But not everyone dislikes the flavor; Papua New Guinea beans are celebrated by some for their distinct smokiness (Beckett 2000; Giller 2017).

The beans are dried to about 7 percent moisture content and poured into bags of one hundred or more pounds (40 kg), then shipped to ports where they are tested for quality (Cargill n.d.; Whoriskey and Siegel 2019). Drying below 6 percent will leave the beans bitter, but moldy beans also are unpalatable. Burlap and jute sacks are favored for shipping because they allow moisture to pass but help protect the beans from cocoa’s tendency to take on flavors from surroundings (Beckett 2000). Roasting, winnowing, and grinding the beans for chocolate seldom occur on site. Many lifetime cacao farmers have never actually tasted chocolate.

One cacao tree will yield about 5–6 pounds (2.5 kilos) of dried cocoa beans a year, about 2,500 beans (Lehnardt 2016). Most cocoa is organic, as the small farmers of Ghana and Ivory Coast, where about two-thirds of the world’s cocoa originates, do not have the money to buy pesticides. A 250-gram chocolate bar (about 9 oz.) requires three to five pods of beans. One metric ton of dry cocoa beans requires 25,000 pods (Gordon 2007; Schmitz 2010).

The quality of chocolate is critically related to the first two steps after harvesting: fermenting and drying. Also, it is related to variety, to roasting, and to *terroir*, that is, where the beans are grown. Beans from Africa, South America, Indonesia, or other chocolate-producing regions will have a distinctly different flavor, even if the same variety is grown (Lachenaud and Motamayor 2017). Large industrial chocolate producers have joined environmentalists in concern that worldwide climate change will have an impact on cacao quality and quantity. While plantation-based cacao farming has contributed to endangered species and deforestation, particularly in the high-production countries of Ivory Coast and Ghana (Recanatì et al. 2018; Rupp 2015), cacao if grown in the traditional rainforest it prefers ought to be a forest-friendly crop. However, the trees’ demands for water and humidity leave it poorly defended against climate change. Weather extremes encouraged by a warming planet make cultivation in the tropics even more difficult than it already is, and African farmers will probably have to shift production to higher altitudes to avoid rising temperatures. An expected 2.1°C increase in temperature by 2050, with no corresponding increase in rainfall, will make a large portion of current cacao regions less productive. Irrigation may be needed (Schmitz 2010; Szalay 2018). Mars Wrigley, as the world’s largest confectionary company by net sales (Squicciarini and Swinnen 2016), has been aggressively pursuing cacao research in a variety of areas, including sustainability. This refers to both the welfare of

small cacao farmers and the welfare of the cacao sector facing global warming. Other large manufacturers also have sustainability programs.

Beyond the challenges of climate change, the cacao tree has for centuries shown itself to be a weak defender against disease and pests. The pests may be animals: monkeys in particular like to grab ripe fruit for its pulp and throw away the rest. But simian threats pale in comparison to fungal ones. Cacao is a fragile tree; beyond its fussy demand for perfect growing conditions, it is susceptible to some two dozen diseases, mostly funguses. These do more than just damage some trees; disease can wipe out entire cacao operations and destroy the entire industry of a region. That has happened for centuries, dramatically driving change in the supply chain as the industry moved around the world to reestablish what from the 1600s on had become a highly profitable crop.

Perhaps the most famous natural disaster on record began in Trinidad, an island near Venezuela, a country then exploited for its high-quality beans. Just as the popularity of chocolate was exploding in Europe, a hurricane and an unknown disease, probably a blight, in 1727 swept the plantations of Trinidad. Capuchin friars who had established lucrative plantations were ruined, and a robust export ended. But some thirty years later, the friars returned to try again by developing a new operation. The planters hybridized a variety they called “Forastero,” or “foreign,” with their familiar variety known since the Spanish conquest, “Criollo,” the indigenous beans growing in Mesoamerica. The result, “Trinitario,” seemed to be hardier and more vigorous, like Forastero, but also offering what they thought was a better taste, like Criollo. The industry in Trinidad limped back to the world market though it never fully recovered its vitality. A global depression in cacao prices along with appearance of witches’ broom fungus in the 1920s led Trinidad again to near-extinction as a cocoa-producing nation. By 2021, it had come back somewhat as a specialty market.

Of the many fungus diseases that may attack cacao trees, witches’ broom has proved one of the most devastating and concerning. While it is a threat only in Central and South America, it could easily be transported to West Africa, which in 2021 was the supplier of nearly all the chocolate we eat in mass-market confections globally. Smallholding farmers in Ivory Coast and Ghana do not have resources to undertake mitigation efforts, and if the disease should jump the Atlantic a worldwide industry could face ruin, along with two million African cacao farmers.

The fungus, *Moniliophthora perniciosa*, attacks central stems of cacao trees to cause a brushlike growth, called green brooms. The tree dies within about three months. Witches’ broom tolerates even high levels of fungicides. In 2020, there still was no cure (Farquharson 2014). Witches’ broom has devastated cacao crops probably for centuries, and farmers’ efforts to stop it has ended up destroying valuable varieties of cacao as well as whole economies. In 1919, an effort to block the fungus and frosty pod disease in Ecuador encouraged growers to eliminate the renowned cacao variety called Nacional in hopes of replanting more robust varieties. It failed, but Nacional was thought to be gone forever. Surprisingly to the cacao world, it was rediscovered in a few old growths in 2009. In Brazil, witches’ broom turned the world’s top cacao-producing region into ruin. Brazil in 2019 supplied about 20 percent of world cocoa (Frydenborg 2015; Ploetz 2007; Toth 2018).

In the 1930s, F. J. Pound, a geneticist at the Trinidad Imperial College of Tropical Agriculture, traveled through the Amazon basin to collect wild pods that showed resistance to witches' broom. Subsequent researchers have relied on his important collection, and his evaluation of conditions that encourage witches' broom (Pound 1943). But his early work was not able to stop the devastation in the 1990s of one of the oldest and most famous cacao-producing regions of Brazil. And deliberate ecoterrorism may be to blame.

Bahia, in northeastern Brazil, was established in 1746 to become one of the world's richest cacao-producing areas. It offered ideal warm, humid weather, and the *cabruca* system, planting cacao trees under a rainforest canopy, proved a perfect environment for a demanding agricultural crop. As Brazil cocoa exports grew 259 percent from the 1840s to 1890s, Bahia became center of a monocrop run by wealthy absentee landlords who relied on local managers, somewhat similar to the cattle owners' operations of the cowboy era in America's Old West.

The American cowboy era ended badly when a hard winter destroyed the monocrop equivalent, cattle. But Bahia grew, and by the 1970s, its main export was cacao despite several cycles of boom and bust. Unfortunately, a 1986 cacao price plunge aggravated worker dissatisfaction. In May 1989, witches' broom was discovered in Bahia. It had never before been found closer than 1,000 miles (about 1,600 km) away. The old growth trees and humid forest surroundings offered perfect conditions for the fungus. Production plunged. Old cacao families were bankrupted, the state economy was in ruins, and 200,000 workers were left unemployed (Caldas and Perz 2013; Moles 2018).

How did the fungus get there in the first place? A 2006 work of investigative journalism indicated it quite possibly was imported on purpose by militant leftists who hoped to destroy the old "cocoa colonels" of Bahia—a rare example (and hard to prove) of ecoterrorism (Caldas and Perz 2013). If it could happen in Brazil, it also could happen in politically unstable countries, most notably Ivory Coast, today the world's top producer of cocoa. Bahia cacao production has in the last few years come back on a small scale with more disease-resistant cacao varieties, relying for business on a burgeoning fine-chocolate movement. But it has become a tiny player in a huge industry.

Witches' broom is arguably the most feared disease of cacao trees but hardly the only threat. Frosty pod (*Moniliophthora roreri*), also found only in the Western Hemisphere so far, could devastate African production (Ploetz 2007). Frosty pod is more difficult to control than witches' broom and destroys the fruit. It apparently appeared first in Ecuador in the early twentieth century but has spread to eleven South American countries (Phillips-Mora and Wilkinson 2007).

Diseases exclusive to the Western Hemisphere marked one reason cacao cultivation moved to Africa, but that continent is not without major disease threats. Perhaps most worrying is Cocoa Swollen Shoot Virus (CSSV), first discovered in Ghana nearly a century ago, and spreading as farmers plant under more full sun that the virus prefers. It is transmitted by mealybugs or by grafting infected materials. Unlike other diseases it works slowly. The tree will die in about three years, meaning farmers may not notice it at first when grafting to clone cacao varieties. In 2018, it had already infected 16.5 percent of Ghana's cacao areas. Cherelle wilt,

which can destroy entire yields, is also becoming a greater concern (Bisseleua 2019; Melnick et al. 2013).

The cacao has been extensively crossbred in an effort to find cultivars resistant to diseases that can devastate entire nations. One such effort did produce a more resistant tree. It also produced a wave of controversy from industry producers to chocolatiers throughout the cocoa sector. Colección Castro Naranjal 51, usually shortened to CCN-51, was the fifty-first hybridization attempt by Homero Castro in Ecuador to reinvigorate the country's production. It produces four times as much as other varieties and is both sun and disease resistant. It quickly took over Ecuador's production as its venerable but intolerant variety of Nacional was replaced. Seeing an opportunity in 2002, the U.S. government in its war on drugs encouraged two top coca-producing countries to replace this source of cocaine with cocoa, specifically the high-yield CCN-51. Results in Peru and Columbia were not as successful as hoped because CCN-51 relies on extensive fertilizer and pesticide use that were too expensive for smallholding cacao farmers (Terenzi 2017; Frydenborg 2015).

Beyond that failure, however, chocolate lovers have claimed that CCN-51 was produced for yield and disease resistance with little consideration for taste. Bitter, dirty, undesirable flavor was how critics described it, despite its genetic composition of almost half Criollo and Amelonado, two varieties we will explore later. Its bad reputation among many fine-chocolate makers has grown to an almost automatic rejection, but supporters said that the assessment is unfair. The quality of chocolate depends critically on its fermentation and roasting; these are almost trade secrets among some producers. CCN-51 as a new variety was at first over-fermented, affecting the taste, according to supporters. But with careful preparation, they argued it can be an acceptable product that can help sustain impoverished farmers (Gordon 2007). In any case, CCN-51 is used by large industrial manufacturers which search for a reasonable, if not fine-flavored, product, and as demand for fine cocoa is small, farmers will continue to grow it.

CCN-51's success as a vigorous variety did not match its success as a palatable variety perhaps because it did not meet expectations of consumers used to traditional tastes. The cacao tree naturally hybridizes. This offers a great opportunity to increase biodiversity but also a greater challenge to researchers hoping to hybridize the trees specifically for disease tolerance, production increase, and flavor. Original varieties of cacao were well established by the 1800s. They seemed perfectly straightforward: Criollo, originally from Central America, was most prized for fine flavor but also the hardest to grow; Forastero, originally from South America, was more robust and hardier but lacked fine flavor; Trinitario, the early hybrid from Trinidad, was also considered to have a fine flavor.

Reputation for quality among cacao regions developed early on among European chocolate consumers. Following disintegration of the ancient Criollo sources in Mesoamerica, in the 1600s the Spanish tried production in the Guayaquil region of Ecuador and areas surrounding Caracas, Venezuela. By the end of the eighteenth century, Guayaquil cocoa flooded the market. But it was considered inferior and so cheaper. Caracas cocoa was considered superior. Cocoa beans were bought and sold based on origin, but most knowledgeable consumers understood generally that Criollo was best, Forastero not as good.

In 1880, British botanist Daniel Morris in Jamaica questioned the traditional divisions. He determined that Forastero should be separated into eight varieties. But growers found his classification confusing and so continued to rely on the three old varieties.

These centuries-old designations lasted until the beginning of the twenty-first century. While the varieties are still commonly described this way among many who write about chocolate, in 2008 they became obsolete. A research team headed by Juan C. Motamayor made an extensive examination of the cacao designations. They determined that *Theobroma cacao* should be separated into ten genetic clusters. The new categories maintained the old Criollo classification, but divided Forastero into clusters labeled as Marañon, Curaray, Iquitos, Nanay, Contamana, Amelonado, Purús, Nacional, and Guiana. Most African countries grow Amelonado, a pod with a smooth skin and melon shape. It originated in the Lower Amazon Basin. The familiar Forastero designation, therefore, is no longer botanically accurate and does not necessarily indicate inferior beans as formerly was often claimed. Trinitario still exists as a hybrid of Criollo and Amelonado (Motamayor et al. 2008).

Research further separates Criollo into ancient and modern, the last being a hybrid. Those consumers who search, then, for what the original ancient Criollo-based chocolate might have tasted like may be disappointed to find that modern Criollos probably do not offer that experience. They nevertheless are expensive, perhaps due more to rarity than flavor, although they are reputed to have a lower bitterness and lighter cocoa flavor.

Nacional (also called Arriba, an area of cultivation), a separate variety originally from Ecuador (once considered Forastero), was presumed to be a hybrid, as pure Nacional was thought to be extinct. However, a collection of DNA samples uncovered several of pure Nacional, and a few growers are trying to bring the old prized variety back (Toth 2018; Frydenborg 2015). It is now available on the market, at caviar prices. Another chocolate highly coveted among fine-chocolate connoisseurs is Porcelana, a Criollo from Venezuela that some consider the *nec plus ultra* of chocolate. But fine chocolate comprises only 5 percent of world production. The International Cocoa Organization (ICCO) categorizes other varieties as bulk, even a few such specialties such as Cameroon cocoa beans, a Trinitario with a distinct red color.

In 2012, the Fine Chocolate Industry Association and USDA Agricultural Research Service paired to establish a genotype map of fine-flavor cacao tree varieties. Growers submitted beans for testing. Those of heirloom quality have genomes mapped to assess geographical distribution and genetic diversity for possible breeding. In 2018, the Heirloom Cacao Preservation Fund was established as a nonprofit to identify and encourage development of rare varieties (Zhang and Meinhardt 2018; Heirloom Cacao Preservation Fund n.d.).

As confusion has only recently cleared regarding true cacao varieties—although the new classifications certainly are more complex—so too has confusion only recently cleared regarding the natural origin of the cacao tree. The Spanish first encountered cacao in Mesoamerica, and so it was assumed to have

originated there. Researchers into the first decades of the twenty-first century continued to believe cacao was indigenous to Central America, possibly growing in Belize as early as three thousand years ago. The presumption of the researchers was that while the Portuguese quickly began to exploit cacao found growing wild in the Amazon basin of Brazil, ancient natives would have been unable to transplant it north. The cacao seed is botanically recalcitrant. That means it cannot survive freezing or drying at temperatures lower than about 10°C. It was thought therefore that cacao could not have survived a trip north from the Amazon basin. The Spanish were able to extend cacao reach by taking cuttings and transporting in their relatively fast ships. Historians presumed ancient peoples would not have had that ability (Grivetti and Shapiro 2009; Coe and Coe 1996).

We now believe they could. The cacao genome sequence, completed in 2010, supports other DNA evidence indicating all cacao actually does come from South America, specifically the Amazon basin. We are not certain how it traveled to Mesoamerica, today comprising the area between central Mexico through Guatemala, Belize, El Salvador, Nicaragua, and northern Costa Rica. Evidence suggests it almost certainly was there by 2,000 BC. Cacao researcher Harold Schmitz (2010) declared conclusively that cacao originated in a single place, the Amazon River basin, in the highlands of Peru. Recent archeological finds in the region show stone containers with traces of theobromine and caffeine, indicators for cocoa, dating to 5,500 years ago. Certainly, the tree appeared in the Amazon basin at least 10,000 years ago, about the same time as humans (Presilla 2009; Frydenborg 2015). Foods originating in the Amazon rainforest but now familiar around the world also include a wide variety of fruits, nuts, and spices. But most storied of its gifts is *Theobroma cacao*.

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Chocolate Conquers the World

We know quite a bit about origins of cocoa as a drink from the Americas. We know it encountered a European palate for the first time through the Spanish colonizers in the early 1500s. We know from Spain it spread to Europe, from Europe to North America, and from there to the rest of the world. This seems obvious.

But historians have discovered that tracing the growth of chocolate use is not as straightforward as it seems. How did cocoa actually move from Mesoamerica to Spain, from there to the rest of Europe and then to the world? And why did its spread take so long? Historians are not certain, as early evidence is scant and conflicting. It begins with the famous first European who hit the shores of a New World in 1492.

Was it Christopher Columbus himself who pulled a sack of cocoa beans onto his ship and then presented it to Spanish royalty? The explorer's son Ferdinand as a witness wrote that during his fourth voyage to the New World in 1502, Columbus captured a Maya trading vessel at Guanaja, an island near modern Honduras. Ferdinand observed that the natives seemed to hold some peculiar "almonds" in great esteem, carefully scooping up any that fell. Sources sometimes extrapolate from this story that Columbus must have actually tried cocoa and brought it back to Spain. Reports from a 1563 history indicated Columbus said he observed "big nuts of the same kind as those in India" in Guantanamo Bay, Cuba, where he landed on his second voyage in 1594. Historians originally presumed Columbus, who had read of Marco Polo's travels in India, guessed these were coconuts. But the tree was not introduced to the New World until later. A second guess was coco plum, but historians now surmise that what Columbus called "big nuts" were not that big at all, but were actually cocoa beans, as Ferdinand added that the natives "value these nuts, using them as currency" (Griffenhagen 1992, 134–135). But we can find no evidence of anything beyond Ferdinand's observations and no indication that Columbus knew what the beans were. Most historians presume Columbus never tasted chocolate.

Stronger evidence comes from Hernán Cortés. We know the Spanish conqueror observed chocolate ceremonies of the Aztecs. But witness Diego Durán wrote that when Cortés and his men were offered a taste, they became suspicious, so refused

(Norton 2006). Several other early chroniclers indicated chocolate was at the least unpalatable, if not a drink fit only for pigs. But as the conquerors were looking for ways to gain wealth from the New World, Cortés noted the natives certainly put great value on cocoa beans. He mentioned that in a letter to the Spanish king dated October 30, 1520 (Dillinger et al. 2000). But his point was not the appeal of a drink. It was as an apparently important Indigenous commodity. The observant Cortés wrote that the Aztecs so greatly valued cacao that they had set up an extensive series of trails throughout the empire to transport it from the south as tribute from cacao-producing areas. Cortés explored the maze of interior paths used to transport cocoa beans to the Aztec aristocracy, the amount counted by the Spanish in *cargas*. One Spanish *carga* weighed 22–27 kilos (50–60 lb.), comprising 24,000 cocoa beans, the standard load. Astoundingly, the Spanish discovered that an estimated 980 *cargas* were required as yearly tribute to the Aztec capital, Tenochtitlán (McAnany and Murata 2007). Cortés did not fail to see opportunities of this system for profit to the conquistadors. He reported to the king that he had secured a grant of land for a Pacific coast plantation that already had been planted with two thousand cacao trees, so that he could begin to take over the apparently profitable tribute operation. Cortés, likely presuming Charles V knew nothing of cacao, described its fruit as resembling an almond. It could be ground for beverage, he wrote, or used whole as money throughout the region. We may guess that Cortés as a person who apparently grew cacao trees also tried cocoa. But we cannot presume that. Even today many cacao farmers have never actually tried chocolate. We have no evidence Cortés either tasted the beverage or sent beans back to Spain—where likely no one would have known what to do with them anyway.

It seems surprising that it came so late, but the first reliable evidence of chocolate introduction to Spain dates from more than half a century after Columbus, 1544. On this date, Kekchi Maya from modern Belize accompanied Dominican friars on a visit to Spanish Prince Philip. Included in the record of gifts they brought to the prince were jars of chocolate as well as beans (Coe and Coe 1996; Dillinger et al. 2000). Chocolate at this time possibly saw growth in the Spanish court, although we again are not sure how widespread that growth was. The first recorded shipment of cocoa beans from Veracruz to Seville is 1585, three-quarters of a century after Cortés. Probably some people in Spain had grown a chocolate habit before that. But we have no reliable evidence of it.

Indications that the first chocolate in Spain was associated with Dominican friars seem more than coincidence; it underpins historians' general understanding of how chocolate conquered Europe. Among the first colonizers to Central and South America after the Spanish and Portuguese occupation in the early 1500s were Catholic friars and monks. They established missions, living among the native people in a quest to convert them to Christianity. But it became a two-way street. Aztecs and Maya in particular also influenced the colonizers, a creolizing process that by the later 1500s saw general acceptance of native food and rituals as well as Spanish food and rituals. While historians contend that the missionaries were not as successful in their efforts to convert American natives as the Spanish had hoped, they certainly were successful in efforts to encourage chocolate migration to Spain (Norton 2006). Monks and friars served as early recorders of native chocolate

customs, notably Franciscan friar Bernardino de Sahagún. Dominican nuns established skilled chocolate operations by the early 1600s, as related by Thomas Gage, but before this we have evidence that nuns in Guanaco (possibly modern El Salvador) began mixing sugar, cinnamon, and vanilla into chocolate as a drink attractive to Spanish. Early physicians whose writings influenced European chocolate habits include Juan de Cárdenas and Antonio Colmenero de Ledesma, both closely associated with the Jesuit order. Physicians during this period often were also religious men, as they would be able to combine physical and spiritual treatments.

We have strong evidence, then, for chocolate's early move from the New World to the Old through the Spanish network of ecclesiastical orders and monasteries. Presumably, it began as a treatment for sickness and preserver of health based on traditional native practice. But the Spanish monastic network did not end at the Iberian borders. Catholic orders in Europe had since the Middle Ages built an extensive web of monasteries and convents, sometimes run under centralized authorities, that historians consider the world's first equivalent of transnational organizations. These circulated people and ideas throughout the Continent. We



Frontispiece of *Chocolate: or, An Indian Drinke* by Antonio Colmenero de Ledesma. The book, originally in Spanish, was first published in 1631, and grew to become the most influential early European study of chocolate. The allegorical engraving depicts the West Indies as a woman giving chocolate to Poseidon, representing the Atlantic world of Europe. (National Library of Medicine)

can presume those ideas included chocolate. Historians have concluded that the first area of Europe outside Spain to learn about chocolate was strongly Catholic Italy, then a region of vast monastic land holdings and papal influence. Solid evidence tells us that monks visiting Rome as early as 1606 included chocolate on their pope's gift list (LaFaye 2018; Korten 2017). We can confidently presume it was not the first time the pope had encountered it.

But again, why so slow? It seems to have required more than sixty years from chocolate's first documented appearance in Spain to its first documented appearance outside of that European country. Some historians suggest that the Spanish crown kept the secret of chocolate production by restricting it to monastery use. We have no solid evidence of that, however, and Europe's fertile monastic network would suggest otherwise (Frydenborg 2015; HNINA Gourmet n.d.). It is also possible that it remained rare as it was expensive, both the product itself and because the sugar added to please a European palate also came from the New World (mostly Brazil) and at first was costly. By the 1600s, the price of sugar dropped. However, that drop did not occur until after 1655. By then the chocolate boom was in full swing. The lower cost of sugar possibly encouraged chocolate's soar in Europe in the decades before 1700 but would not explain why it took so long to establish in the first place. We can surmise that chocolate must have been circulating widely through the chain of monasteries long before first reliable evidence of its use.

From Italy, perhaps, or directly from Spain, we can presume chocolate spread throughout Europe, also through the monastic network. But evidence for that is circumstantial. Other theories compete. The oldest legend, still enthusiastically maintained on chocolate lover websites, tells us that cocoa came to France with Anne of Austria. The appointed bride in an arranged marriage with future king Louis XIII, Anne was the oldest daughter of Spanish king Philip III. The two royals in 1615 were married in Bordeaux—a city significant to chocolate because it is not far from Bayonne, as we explore later. Could Anne have picked up a chocolate supply in Bayonne as a gift to Louis? The story has a certain charm, but historians are skeptical. In fact, the fourteen-year-old was married to Louis, also fourteen, by proxy. That is, they were not actually present in Bordeaux. Nevertheless, the Spanish queen was supposedly a chocolate aficionado as were apparently many Spanish elites by this date. Legend tells that she brought a retinue of chocolatiers to the French court, and from there it spread around the country.

A closer look at this beguiling story shows a pattern of holes. The couple disliked each other. They never ate together. The court distrusted Anne's Spanish roots and retinue. A detailed recording of Louis XIII's drinking habits did not include chocolate. Did Anne herself include chocolate in her queenly intake? Perhaps, but it is unlikely the taste transferred to the court or to anyone outside it. The story persists, however, because it was presented in arguably the most important book on gastronomy ever published, *Physiologie du gout* by Jean Anthelme Brillat-Savarin. Translated as *The Physiology of Taste*, it has been in print continuously since its 1825 debut. Brillat-Savarin raved over chocolate's value for health (Brillat-Savarin [1825] 1848).

It was this famous French gourmet who relied on the weight of his prestige to offer the tale of Anne popularizing chocolate in France. But revealingly, he included no reference for the story. One possibility is that the celebrated author in

this case confused Anne of Austria with Marie Thérèse of Austria who, as wife of King Louis XIV, did play a documented role in popularizing chocolate in France. But that was much later, and a reading of Brillat-Savarin's recounting seems so incidental that one might conclude he just tossed it out for amusement but did not really believe it himself.

A competing and more credible narrative tells us that chocolate reached France through the Jewish diaspora that fled Spain and Portugal during the Inquisition. Many settled in the southern French border city of Bayonne. Supporters of this theory, such as the Academic du Chocolat of Bayonne, do have on their side a documented centuries-old production of chocolate in the port city (Academie du Chocolat de Bayonne n.d.). Jewish entrepreneurs there by the 1700s had established extensive chocolate operations, mostly artisanal. In 1856, it had grown to thirty-three chocolate factories. Significantly, we have some suggestions that chocolate production began there a lot earlier; after 1492, Jewish populations had already begun to flee from Portugal and Spain to settle around Bayonne. Documented evidence shows that up to one thousand had fled there by 1602 (Zink 1994). Many had backgrounds as apothecaries (today's pharmacists) who were also often in the business of chocolate. Some clearly had trade connections to the New World—much of it was illegal because smuggling of cocoa was formally forbidden under a Spanish Crown monopoly. The narrative contends Portuguese Jewish refugees also reportedly kept early ties with chocolate commerce in Brazil. But this suggestion is undermined by the fact that Brazil did not see cacao production of any scale until after 1665 (Rossin 2013; Walker 2007).

It is surmised, nevertheless, that the Jews in Bayonne were possibly the first to produce chocolate in France and that they worked to diffuse its popularity throughout the country. Another tantalizing bit of support for the Jewish connection is evidence that Colmenero, who wrote the influential book that launched Europe's chocolate revolution, was a Morisco from Andalusia, that is, a Jew forcibly converted to Christianity.

On April 23, 1615, Louis XIII signed an edict of expulsion for all Jews in France. This would seem to end Bayonne Jewish chocolate operations. But it was a dead letter; there were no Jews in France. Refugees around Bayonne had officially, or at least ostensibly, converted to Christianity. It is probable Bayonne saw at least some early chocolate operations before the 1600s, but given the variety of restrictions and persecutions, it seems unlikely Bayonne Jews introduced chocolate to France or the rest of Europe.

We return to the chocolate diffusion theory of the European monastic web with its tight relationships between religious and medical men. Even though Brillat-Savarin led readers astray with his fanciful tale of an Old Regime king and queen, he also in another reference suggested more plausibly that Spanish monks and friars introduced chocolate as gifts to their French brethren (Brillat-Savarin [1825] 1848, 91). We do have solid documentation that they gifted chocolate to the pope, so it is no great stretch to presume they also gifted it to each other. Because it was reputed to be such good medicine, it is also not surprising that clergy and physicians would influence the court in France to consider it as a remedy. In 1643, René Moreau, a prominent Paris physician, published a French translation of Colmenero's work. That late date

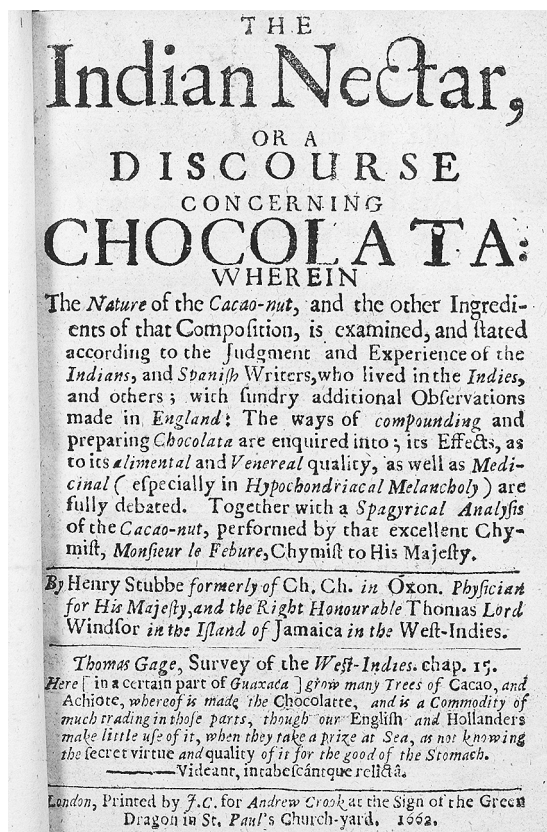
does not tell historians much, but Moreau's preface is more revealing. He dedicated the work to "the cardinal of Lyon," Alphonse de Richelieu, brother of the influential chief minister of Louis XIV. Moreau said the cardinal had asked him for advice concerning chocolate, "this foreign drug that has now gained a very great reputation all over Europe" (Colmenero de Ledesma 1643, n.p.). Who told Alphonse about chocolate? Historians suggested it was a Spanish monk, "to moderate the vapors of his spleen" (Coe and Coe 1996). We are not certain when the splenetic cardinal asked for help. But we do have more evidence for what seems the most reliable conclusion: chocolate spread from Spain to Italy, then to France—the world's richest, most powerful country of the era—and then to much of the rest of Continental Europe through the international monastic network of the Roman Catholic Church.

England was a bit of a different case, as it was the most prominent Protestant country of the time. It seems unlikely at this time that a country hostile to Spain and its "popery" would have had the same network of cocoa spread through Catholic clergy. Researchers believe its use in England predated that of coffee or tea, although even by the earlier 1600s, it must not have been common. A story from

about the 1650s tells of a coffee-house misleading an inexperienced drinker by serving coffee but calling it chocolate (Norton 2006; Loveman 2013).

Evidence seems to indicate, however, that as in Spain and France, chocolate reached London first as a medicine among a few wealthy who admired Spanish customs. Colmenero's text was translated into English in 1640; this suggested chocolate had been introduced to the British before that date, even though it appears to have been generally little known. The first advertisement for chocolate that historians have found dates from 1657.

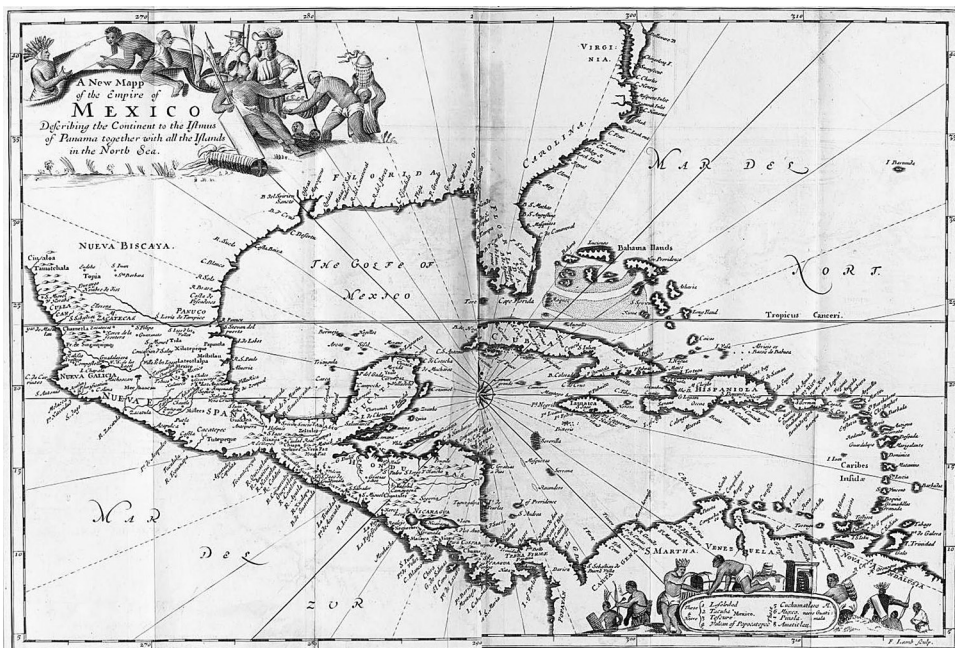
In 1662, English physician Henry Stubbe published his well-known book on chocolate. He described a variety of cocoa then available in London. "Chocolata-royal" cost 6s. 6d. per pound (0.45 kg); "ordinary chocolate" cost 3s. 8d. Diarist Samuel Pepys in 1661 recorded his first taste. We can be nearly certain, however, that cocoa had



Title page from Henry Stubbe, *A Discourse Concerning Chocolata*, 1662. An English physician and essayist, Stubbe's 1662 work helped to build popularity of chocolate in England. (National Library of Medicine)

been introduced to England some years before this date. And again, we have some evidence of a Catholic connection. Thomas Gage, an Englishman who had joined a Dominican monastery, published his chocolate experiences in 1648, following travels to the New World. It is from his *A New Survey of the West-Indies* that we learn of Gage's affection for the beverage. Gage explained that *chocolatte* could contain many ingredients, "but the chief ingredient (without which it cannot be made) is called cacao, a kind of nut or kernel bigger than a great almond, which grows upon a tree called the tree of cacao" (Gage [1648] 1677, 238). Gage, who as a friar spent twelve years touring Mesoamerica, grew to rely frequently on chocolate for good health. As Gage described it, he drank a cup in the morning, one before dinner, one an hour or two after dinner, and another between four and five in the afternoon. He would drink another if he wanted to stay up late to study, "which would keep me waking 'til about midnight." He reported this kept him healthy throughout his stay in the New World, but though he didn't experience it personally, he had observed chocolate made some people "fat and corpulent" (Gage [1648] 1677, 247). Historians have also found interesting evidence that students from abroad introduced chocolate to Oxford by 1648 (Grivetti and Shapiro 2009).

By the 1640s, chocolate had already become popular in Spain, Italy, and the Netherlands, Gage wrote. Possibly the Netherlands became an early cocoa adopter based on its repeated raids on Spanish and Portuguese trading ports, although Britain enthusiastically joined in those raids and the contraband collected from



Central America, the origin of chocolate, 1677. From Thomas Gage, *A New Survey of the West-Indies*. Gage included early descriptions of chocolate use in Jamaica and Mexico. (Gage, Thomas. *A New Survey of the West-Indies*. London: Printed by A. Clark, to be sold by J. Martyn, Robert Horn and Walter Kettilby, 1699.)

them. But Gage seemed to presume that in 1645 cocoa was still unfamiliar to his countrymen, as he felt a need to explain what it was and to offer ways to obtain it. “But how then might this cacao with the other Indian ingredients be had in England?” By trading Spain for it, he suggested, “or not slighting it so much as we . . . have often done upon the Indian seas.” Gage said the Spanish told him British sailors were so unfamiliar with cocoa beans that if they captured “a ship laden with cacao, in anger and wrath we have hurled overboard this good commodity, not recording the worth and goodness of it, but calling it in Spanish *cagaruta de carnero*, or sheep’s dung in good English” (Gage [1648] 1677, 247). This hearsay may have been apocryphal, as the Spanish would have had little good to say about the raiding British navy and corsairs. But we have some corroboration from José de Acosta, who wrote that in 1587 a Spanish ship carrying cacao was destroyed by English pirates who thought the cargo was worthless (Presilla 2009). Then again, de Acosta also was Spanish, a Jesuit missionary who published a natural history of the New World in 1590.

Evidence indicates that chocolate had become a presence on the streets of London by 1652. In a second English translation of Colmenero’s book that year, translator James Wadsworth said the earlier edition had attracted the attention of the court, leading to wide appeal. We do not have evidence of that, but Wadsworth added that chocolate could be purchased from a bookseller, John Dakins, Holborn. Familiarity in England seems to have mushroomed after the acquisition of Jamaica, and cocoa was becoming generally popular by 1665. Pepys in that year wrote about his introduction to chocolate taken at a coffeehouse. This was also the year of the Great Plague of London, however, keeping many away from the drinking houses and possibly tamping what might otherwise have been an even greater increase. Britain had captured the Spanish-controlled island of Jamaica in 1655, acquiring its small cultivations of cacao. The British navy apparently had changed its mind on cocoa beans. According to a 1656 report in *La Gazette* of Paris, eleven English vessels fought the Spanish for the port of Cartagena. There, according to the article, they captured a Spanish ship “with a cargo of cocoa, from which they sent, to My Lord Protector, all the fruit needed to make the beverage which they call chocolate” (*La Gazette* 1656, n.p.). In 1657, the *London Public Advertiser* placed a notice that “at a Frenchman’s house” an excellent “West India” drink called chocolate would be sold (Grivetti and Shapiro 2009). The puritanical Commonwealth then ruling Britain discouraged social indulgences, but it did not last long—the Restoration of 1660 saw a return to relaxed social rules. Coffee and chocolate houses began to spring up around the restored kingdom.

British business concerns hoping for a new colonial cash crop by 1660 had broadened Jamaica’s small cacao operations. In 1662, during his visit, Stubbe observed British soldiers surviving on local cocoa paste mixed with sugar and water. It was no longer as necessary to trade with the Spanish, as Gage suggested, or capture ships to acquire cocoa beans. Relying on slaves to work the plantations, British enterprises in Jamaica tried to grow cacao into a supply to challenge that of the Spanish possessions. A 1672 British government report said it was “one of the chief articles of export.” But hurricanes and disease decimated the fragile trees. By the 1880s, a few scattered trees remained. Stiff taxes on cocoa imports

encouraged Jamaican colonists to move to sugar and later coffee as more profitable substitutes (Morris 1882; Commonwealth n.d.).

Back in London, White's Cocoa House was founded quite late in the story, 1694, by an Italian, Francesco Bianchi. The Italian connection to public houses of cocoa had reached Paris a quarter of a century earlier: the first record historians have of chocolate served to the public in Paris, in 1669, was also launched by an Italian, Francesco Procopio dei Coltelli (*Mercure de France* 1736). Germany's first chocolate house appeared just four years later in Bremen, although Dresden emerged by the 1800s as the center of German chocolate manufacture (Ritter Sport n.d.). Venice became a playground for Europe's traveling elite, and its chocolate was considered to be among the Continent's finest. A French newspaper of 1683 reported approvingly that they drink it "hot, as in Paris" (*Mercure Galant* 1683, n.p.).

The colonies of North America received their first documented cacao shipment in 1641, on a Spanish ship blown by a hurricane to St. Augustine. The first documented chocolate house dates from 1682, in Boston. Records that year show a ship entered Boston harbor with 100 cwt. of cocoa beans (cwt. = 100 lb., .45kg). Probably the beans were Jamaican, although the document indicates the ship came from the tiny British colony of Nevis (Grivetti and Shapiro 2009). Nevis was well known for sugar plantations but not chocolate. While this seems quite late for a first shipment, clearly colonists had already become familiar with the drink based on close ties with London. Evidence shows it was served privately as early as 1667. As for public chocolate houses in the American colonies, evidence seems to indicate they did not gain the popularity they enjoyed in Europe, as most colonists drank chocolate at home, not in a club. Some evidence tells us cocoa reached the southwest of North America as early as the 1530s, although the first solidly documented reference comes quite late, 1690 (Grivetti and Shapiro 2009).

By the 1700s, chocolate was widely enjoyed as both medication and beverage among the elite of Europe and North America and by nearly everyone in Central America. While cacao originated there, the northern countries of South America did not at the beginning consume chocolate as the Aztecs and Maya did. Pre-Columbian South American cultures apparently preferred the sweet pulp of the pod made into a drink, either fermented or not. Historians think they threw away the seeds, perhaps because other stimulating beverages such as maté were generally available in South America, but not Central America. By the 1700s, however, chocolate use had become widespread in northern parts of the continent. Cocoa from Venezuela in particular became popular in New York City, but during that time one-fourth of the harvest stayed home for local Venezuelans. A large percentage of this coveted "Caracas cocoa" (actually shipped usually from the port of La Guaira) went to Spain; from 1650 to 1700, seven million pounds of it left the port. Throughout much of Central and South America after independence in the nineteenth century, chocolate lost popularity to coffee, probably not due to a change in tastes but to rising costs. While Columbians continued to show preference for chocolate, Brazilians did not show much interest.

Chocolate came comparatively late to Russia. Historians believe it was introduced in the 1700s by Catherine the Great, but even at the end of the nineteenth century, when western Europe and North America had become a chocoholic's

paradise, in Russia it still seldom reached beyond society's elite (Squicciarini and Swinnen 2016). By the eve of the Russian Revolution in 1917, it had become generally popular. In 2018, its popularity in Russia was spreading four times faster than in the rest of the world (Litvina 2018).

Australian chocolate preferences mirrored those of Britain. Legendary English manufacturer Cadbury has dominated. Its Dairy Milk bar has consistently been Australia's largest seller, although chocolate lovers there, as in Russia and in much of the rest of the world, have shown growing interest in fine-chocolate and bean-to-bar producers. In 2020, Australia and New Zealand led the Asia-Pacific nations in chocolate consumption, growing faster than the global market (Businesswire 2020; Yu 2017).

Today most of the world's bulk cocoa comes from West Africa (about two-thirds), but cacao trees reached the mainland only toward the end of the 1800s. A few African missionaries and colonials did drink chocolate, but Indigenous populations showed little interest in either the beverage or bar. Even today, many cacao farmers have never tasted chocolate. The consumer chocolate market in large cocoa countries like Ghana is tiny. However, chocolate demand in many African countries has recently increased as more cocoa-producing countries have cocoa-grinding equipment, making it possible to process the beans into nibs that can be manufactured locally into chocolate at a lower cost.

Interest in chocolate has never been strong in Muslim countries, although some Europeans tried to kindle it. In the Paris press of 1685, the French ambassador was reported as serving chocolate at the French embassy in Turkey. The Ottoman Grand Vizier asked the ambassador if he really liked that drink, to which the ambassador replied he preferred it, and tea (*Mercure Galant* 1685). The Turkish were coffee drinkers.

Among Pacific countries, only the Philippines has had a long relationship with chocolate. The former Spanish colony hosted missionaries who centuries ago introduced the beverage to the natives, and the cacao trees to cultivation by 1670. Chocolate in India and China did not catch on, despite efforts of Jesuit missionaries who were so passionate about the drink, and the Portuguese who hoped to establish a new market. We presume chocolate was a latecomer to China, but some evidence shows missionaries carried it to the Portuguese colony of Macao as early as 1674. By the 1700s, it was a common import, but probably mostly as a medicine, and likely never available outside of European missions. French export records from the later 1800s do, however, indicate quite a few shipments going to China and Turkey. Today chocolate in China is growing with the country's increasing affluence. Before the 1970s, almost no one had heard of it; in 2019, a Chinese consumer could choose from seventy overseas chocolate brands. Multinational companies such as Mars considered it a prime growth market.

Recent growth has also been strong in India. It is not new to the country: long-time British colonial rule encouraged the East India Company to introduce chocolate as early as the eighteenth century. Catholic missionaries grew cacao for their own use, but few Indians at that time had tried chocolate. After independence in 1948, the confectionary giant Cadbury hoped to find a new cacao source in India, but production was hampered by price fluctuations and strikes. Cadbury is still is

the most familiar retail chocolate in India, followed by Nestlé (Squicciarini and Swinnen 2016). Japanese, like many Asians, prefer salty snacks, but chocolate has become a familiar staple on supermarket shelves. The world's fourth largest multinational producer of chocolate is Meiji Holdings of Japan.

But the greatest modern shift in fame of chocolate-loving nations begins and ends with Switzerland and Belgium. The Swiss came late to the table, historically speaking: as a producer it was not even on anyone's shortlist until the nineteenth century. But two Swiss inventions, milk chocolate and conching for a smoother, mellower product, revolutionized the world's definition of "chocolate" and thrust the small country into worldwide chocolate fame. The well-conched milky flavor of Swiss chocolate has become so popular that today the world's number three multinational producer is Nestlé of Vevey, Switzerland, and number eight is Lindt & Sprüngli of Kilchberg. Jean Tobler, who unveiled his famous Toblerone in 1899, merged with Swiss cocoa giant Suchard in 1970. It in turn merged with Kraft, later becoming Mondeléz. Swiss manufacturer Cailler, established in 1819, became part of Nestlé in 1931.

Belgian chocolate has become well known for its high-quality, artisanal bars and confections. But as chocolate history goes, the Belgians are even more recent players than the Swiss. Belgium throughout the cocoa revolutions of the nineteenth century continued to import most of its chocolate (Squicciarini and Swinnen 2016). The apothecary (pharmacy) of Jean Neuhaus had for several decades sold its medicines dipped in chocolate to patrons locally. In 1912, his son, Jean Neuhaus Jr., decided to offer a variation on that theme. Instead of medicine, he used as fillings ganache (chocolate and cream), buttercream, or nut paste. He called the result pralines. Nowadays consumers generally call them Belgian truffles. For preservation and presentation, Neuhaus in 1915 invented a box he called the ballotin. Worldwide popularity of Neuhaus and other Belgian chocolate such as Godiva and Leonidas grew after 1930, but Belgian exports saw its biggest spike beginning in the 1980s. In 2013, Belgium manufacturers exported most of their chocolate, 500,000 tons. Belgium in 2021 still held its reputation as a high-quality chocolate source, and while multinational processor Barry Callebaut maintained an enormous factory in Belgium, in 2016, 90 percent of Belgian chocolate still came from small producers.

Belgium's reputation for fine-quality chocolate has recently come under challenge from small producers around the world, who are cutting a larger slice of the quality chocolate market. A craft chocolate movement began in the 1990s to emphasize the quality of fine chocolate, often from a single origin, produced with simple ingredients by small operators as opposed to huge conglomerates that typically use lower-quality bulk beans. "Bean-to-bar" was the label apparently coined in 1996 by Californians John Scharffenberger and Robert Steinberg of Scharffen Berger Chocolate (Giller 2017). The cocoa entrepreneurs established one of the first craft chocolate firms in the area that had for more than a century been famous for fine cocoa, San Francisco. Domingo Ghirardelli and Etienne Guittard opened chocolate businesses there three years after the California Gold Rush of 1849. Ghirardelli by 1895 had become one of the state's largest businesses. It was acquired by Swiss giant Lindt & Sprüngli in 1998. While Ghirardelli no longer

operates in San Francisco, it is memorialized in the city's famous Ghirardelli Square. Fourth-generation owner Gary Guittard of Guittard Chocolate Company by 2021 had taken a strong interest in the fine-chocolate movement with intriguing bars using beans from Madagascar and South American small growers (Guittard Chocolate Company n.d.).

San Francisco's Scharffen Berger, however, is credited with establishing the craft chocolate movement that in 2019 comprised 183 small-batch manufacturers around the United States. Its exciting start for fine-chocolate lovers had a perhaps disappointing end, however. In 2005, the U.S. confectionary giant Hershey bought the company. Four years later, it closed it and moved production to Illinois. Some critics contended the values of the original firm had been compromised, though in 2020 it still advertised fine chocolate under the Scharffen Berger name; the Scharffen Berger website did not indicate that it was a Hershey brand (Martin 2015). However, in 2021 Hershey sold the brand to former employees and an experienced confectionary executive, Paul Cherrie. Scharffenberger rejoined as an advisor, and the company moved production back to the West Coast, to Ashland, Oregon (Candy Industry 2021).

Worldwide, the craft chocolate movement by 2021 seemed to have gained steam based on a variety of twenty-first-century interests surrounding the cocoa industry. Child labor, fair trade, and ecological sustainability have grown to concern big multinationals as well as small operators, but the craft leaders have contended they are better able to address ethical concerns of chocolate production. One of the most well-known micro-operators, Shawn Askinosie of Springfield, Illinois, argued in 2020 that "Askinosie Chocolate was born committed to fairness, sustainability, minimal environmental impact, and community enhancement" (Askinosie Chocolate n.d.). He sourced his beans from quality small-production countries instead of the dominant Ivory Coast and Ghana. The products of small and micro-producers were by 2021 attracting more interest also as consumers were beginning to search for chocolates with higher levels of healthy phytochemicals and better flavor. In recent years, some researchers have taken a closer look at how processing can affect flavor even before the beans have left the farm. Darin Sukha, a research fellow at the Trinidad-based Cocoa Research Centre at the University of the West Indies, has argued that the most critical factor in developing fine-flavored chocolate is in the fermentation process. This usually is undertaken on site prior to shipping, as cacao naturally begins to ferment soon after picking (Sethi 2018).

What is "better flavor" in chocolate, and how do we judge it? It depends somewhat on where we grew up and what we liked as children. We sometimes compare fine chocolate to fine wine, with a *terroir* and fruity or astringent characteristics, but most people do not learn much about wine until they are adults. We establish our chocolate preferences almost before we can walk. In North America, for example, Hershey and Mars have dominated the cocoa market for a century. Americans have come to prefer the sweet, milky, and (some say) slightly sour flavor of a Hershey bar. In Britain, Cadbury's Dairy Milk sets the standard with a mild, high-milk product, while in Switzerland satin-smooth milk chocolate is favored, as both innovations came from that country. Research shows French

prefer a darker product and more bitter flavor. Germans and Japanese do not prefer as bitter a flavor, and Japanese in particular side with the Swiss on smooth, buttery texture (Sandborn 2015).

No matter what we grew up with, the adventure in eating chocolate as adults is to bring an open mind for new flavors and textures. We can rely on tasting approaches that experts have developed to evaluate chocolate quality.

We can begin with the label. Fine-chocolate manufacturers often indicate the cocoa's country of origin. Some experts will find a distinct citrus flavor in, for example, Madagascar cocoa, or a slight smokiness of Papua New Guinea that some people like. However, many chocolate bars do not indicate country of origin. It is difficult for larger producers, as so much cocoa on the world market is a mixture from several countries. But blended chocolate, like blended wine, is not necessarily inferior. Procedures during processing, particularly roasting, some producers argue are more important to final flavor. Many producers keep their roasting process secret.

The label on chocolate may not indicate source, but it always indicates ingredients as by law it must. Fine-chocolate lovers argue that simple "two-ingredient" chocolate is preferable: cocoa mass (or cocoa liquor) and sugar. Can one dispense with the sugar? Yes, although the strong bitterness and astringency of 100 percent cocoa repels many who are not used to it, as it repelled the Spanish when they were first introduced to the Mesoamerican drink. Chocolate connoisseurs generally reject what they consider to be a peculiar artificial taste of sugar substitutes such as aspartame. Note: if sugar is the first ingredient listed, we can assume the product contains a lot of it. Fine chocolate does not load up on sugar, as critics say that it can cover up for low-quality cocoa. Probably it is the heavy sugar dose of typical mass-produced milk chocolate that led to its reputation for promoting tooth decay. Chocolate enthusiasts definitely reject chocolate in which palm oil, vegetable oil, or other Cocoa Butter Equivalents (CBEs) have replaced cocoa butter. These too must be listed on the label.

Cocoa mass above 70 percent (the rest being mostly sugar) generally is less popular among a general public that does not like the characteristic bitterness and astringency of dark chocolate. Milk chocolate and more sugar tames that bite, but while milk chocolate has a reputation for low quality, perhaps that is unfair. Fine-chocolate enthusiasts look for a milk-based product with at least 40 percent cacao mass; by law milk chocolate in the United States can contain as little as 10 percent (FDA 2019). Note the percentage of chocolate comprises both cocoa solid and cocoa butter, so two 70 percent bars can taste different. More cocoa butter leaves a smoother taste and is preferred for *couverture*—the chocolate that pastry chefs use in desserts and toppings. (Valrhona of France is not a small producer but enjoys a fabled reputation in the culinary world for quality.) Percentage of cocoa butter, however, is seldom listed on the label. What is "bittersweet" chocolate? The term is not regulated, but Hershey's Special Dark, sometimes used as a U.S. standard, is 45 percent cocoa solids. Chocolate produced for baking labeled "bittersweet" usually is gritty and may be based on inferior quality beans, with the expectation that will be covered up in the baking process (Gordon 2007).

Milk chocolate will of course list powdered milk. Also listed on a label may be soy lecithin added usually as an emulsifier. Some chocolate lovers do not consider this objectionable, while purists would balk. Vanilla is a popular flavor enhancer, although a lot of it can cover up off tastes of poor chocolate. Most fine-chocolate lovers avoid vanillin, the artificial substitute. The Dutching process introduces an alkali treatment to soften the bitterness and darken the product. Consumers interested in health benefits should know it also reduces the phytochemicals. It is a treatment, usually employing potassium carbonate before roasting, and so it is not listed as an ingredient, although most typical cocoa powder is Dutched. The treatment must be signaled on the label. While it is not considered a fault, too much can produce a soapy taste.

The label may also list nuts, fruit, cinnamon, peppers, or many other ingredients. But compared to the imagination of our forebears, chocolate today is hardly flavored at all.

To educate our taste buds, we can approach chocolate as we might taste wine. Many fine-chocolate connoisseurs also enjoy a glass of good wine, perhaps even together. Culinary experts suggest, however, that wine be avoided with fine chocolate. Both are a bit astringent and so can fatigue the palate. Recommended alternatives are spirits such as whiskey or even beer. For those who do not drink alcohol, sparkling water may be an attractive substitute that does not interfere with chocolate flavor.

As with wine, we begin by examining the product. A dark color does not necessarily indicate a better chocolate, but usually fine chocolate will be dark with possibly a reddish tint. Dark chocolate should have a shiny look. Do we notice a white powdery coating? Oh-oh. It is either fat bloom or sugar bloom. If it is the first, we're in luck! Well, sort of. It is caused by poor storage with widely fluctuating temperatures that have taken the temper out of the product. It can be retempered by melting. (But are we really going to do that?)

Sugar bloom may be betrayed by crystal spots and whitish coating. We probably had the chocolate in the refrigerator, then warmed it too quickly, encouraging moisture condensation. Water, as chocolatiers have known for centuries, ruins chocolate. Can you eat it? Yes, just as you can eat chocolate with fat bloom. But it is a bit soggy and not very appealing. Dark chocolate properly stored (60–68°F; 16–20°C) will last about two years (Harvard T.H. Chan School 2021). Manufacturers carefully wrap the product to avoid chocolate taking off flavors or oxidizing. Unlike some red wine, chocolate never improves with age. An old challenge to chocolate manufacturing and consumption in tropical regions used to be the continual problem of dealing with a product that easily melts. Today's technologies can address this, but air conditioning and refrigeration come at a price in countries where electricity is expensive and not always reliable.

Minute air bubbles on the surface may not be noticed, but discerning consumers know they can indicate carelessness in molding.

Quality chocolate should break with a snap, not flaccid, but also not sharp as snapping a stick. That hard snap warns us of a dry texture betraying loss of temper. You can reheat to retemper or put up with the sandy, dry mouthfeel.

Good chocolate should open with a strong unmistakable fragrance. Nothing in the world smells, or tastes, like real chocolate. A smell of sugar or vanilla up front indicates lower quality.

If we have come this far without taking a bite, let's give ourselves extra points for patience. Go ahead and bite. Pause for a few seconds to see if it begins to melt in the mouth. One of the tasteful aspects of cocoa butter is its low melting point, a few degrees below body temperature, for a silky chocolate feel. CBEs sometimes leave an objectionable waxy quality and higher melting point. What do we note on chewing? We can draw air in to enhance flavor as we would in wine tasting. Vanilla? Sugar? Dairy? Citrus? Raisins? Cherries? Toffee? Salt? Smoke (called "hammy" in the industry)? Waxy? Metallic? Bitter? Astringent? Something unexpected? Cocoa easily absorbs all kinds of off odors, an argument against loading up on bars from the gas station (Sandborn 2015).

Sometimes chemical or off flavors will come through after we swallow, the aftertaste or, in wine terms, the "finish." As in wine, a long aftertaste (thirty seconds) indicates quality or betrays off flavors. Some manufacturers presume nobody eats chocolate slowly and expect that off flavors probably will not be noticed.

Nowadays we generally expect a smooth texture, although a slight grittiness is not considered a fault. It is a trait of some old-fashioned chocolate processed the traditional way. Fine-chocolate lovers will describe differing tastes based on geographic origin or different varieties, such as criollo, Trinitario, or the former forastero. But sometimes even chocolate labeled in this way is a blend, as even on a single farm several kinds of cacao trees are present. Famous names such as Porcelana and criollo actually are not regulated.

For those of us who would like to make a serious effort at becoming a fine-chocolate taster, the Fine Cacao and Chocolate Institute offers its Cacao Grader Evaluation form available online (chocolateinstitute.org). Probably the chart is more detailed than many of us could use, as it includes external bean evaluation as well as aroma and taste evaluation: sixty-one rating boxes in all and one more for overall impression. The taste ratings separate acidity, bitterness, and astringency. While bitterness and astringency are sometimes confused, careful tasting of chocolate, also true for wine-tasting, shows them to be different. Astringency is a dry, puckery mouthfeel, described by some wine tasters as a sense of touch in the mouth and not a sense of taste. Bitterness is one of the basic tastes. In chocolate, astringency comes from phenolic compounds, while bitterness usually comes from theobromine (but could come from over-roasting). Theobromine is a stimulant similar to caffeine, one attraction, or concern, of chocolate over the centuries. The phenolics comprise compounds of the flavonoid class—that is, antioxidants that we seek to consume for better health. Research shows both of these are highest in chocolate containing a high percentage of cocoa solids and lowest in most milk chocolate. They are not found in white chocolate (Meng, Jalil, and Ismail 2009).

So what does this tell us as consumers? That bitterness and astringency are highest in dark chocolate, and yet these flavors betray a more stimulating product possibly better for our health. For those of us who do not like bitter chocolate but still want a healthier snack, chocolate, like so much in life, requires trade-offs.

The chart's ten aromas include coconut, fruit, floral, and spicy. Defects, a list of sixteen, include hammy, moldy, cheesy, metallic, and heated fat.

Chocolate expert and author Clay Gordon recommended keeping a chocolate journal to discover favorite flavors and learn about brands and varieties of chocolate. He suggested recording time, date, and location of tasting, where purchased, cost, ingredients and manufacturing information, initial impressions, taste, texture, and overall, with a sparkling water, lemon water, or macha tea palate cleanser between. And now it's your turn.

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Sweet History

Chocolate and Health

Cocoa, originally consumed mostly as a beverage and unknown to the Old World, was for centuries presented as a medicine. This idea reflected the original presumption given the two other new beverages introduced into Renaissance Europe, coffee and tea. In the case of chocolate, the connection to health and healing was stronger. The original Aztec and Maya natives demonstrated to Spanish colonizers that it should be considered as a ritual and a remedy but not a treat.

But to consider chocolate as a medicine plunged European physicians into a dispute that spanned three centuries. The matter was critical; debate brought into question the central philosophy behind European medicine since the Middle Ages, a philosophy that itself began in antiquity with Hippocrates. It was, finally, chocolate that contributed to its demise.

Hippocrates, today remembered as the father of medicine, died almost four hundred years before the Christian era, 370 BC. He is one of the ancient Greeks whose name is still familiar to most people, perhaps for the famous “Hippocratic Oath” that doctors still purportedly follow today. Hippocrates made a dramatic break in the way human beings considered disease and cures. He did not blame illness on God’s will. Instead, he considered illness to be a natural process, and so it could perhaps be addressed by treatments offered by human beings that went beyond prayer.

Hippocrates’s writings themselves were not well known. But they were interpreted some centuries later by a physician not nearly as famous, yet much more significant to European medicine and, ultimately, to chocolate.

Galen, a Roman physician of the second century AD, left a body of important work covering practical anatomy and medical philosophy. His extensive work in anatomy and the philosophy of illness made his text the only universal medical reference in Europe from its rediscovery in the Middle Ages through its discredit in the mid-1800s. As a physician who based his approach, as Hippocrates had, on

natural causes and treatments, Galen expanded the centuries-old system of his illustrious predecessor to establish the humoral theory of disease. Galen proposed that all human illness stemmed from an imbalance of the four humors: blood, phlegm, yellow bile, and black bile. As these were based on body excretions, they would fall into categories that determined both temperament and ailment. An imbalance would cause suffering, and so the patient would need to be put back in balance through diet or other treatment, primarily venesection (drawing blood). Blood was hot and moist; phlegm was cold and moist; yellow bile was hot and dry; black bile was cold and dry. All known foods fit into these categories. Treatment was based—along with prayer for good measure—on reestablishing humoral balance.

Physicians for more than half a millennium of European medical practice based their expertise not on experiments and evidence but on this “library medicine”—mastery of Galenic texts. Galen, it was presumed, knew everything there was to know about disease and treatment. Foods based on Galen’s original culture, Mediterranean, had become well known throughout Europe.

In the 1600s, three substances previously unknown to Europe burst into this closed system. The earliest of those was chocolate.

The Spanish conquest of Mesoamerica following the 1492 voyage of Columbus brought Europeans into a clash disastrous for native peoples. But the Spanish did not simply erase or isolate Indigenous American culture. Colonists merged cultures through missions, marriages, and appropriation of Aztec and Maya traditions. Spanish religious orders in particular showed curiosity toward native customs. Among the most curious objects were the brownish almond-shaped seeds, or beans, that the Maya and Aztecs seemed to so value. Jesuit missionary José de Acosta, who spent seventeen years in Mexico and Peru, observed:

The chiefe use of this Cacao, is in a drinke which they call Chocolate, whereof they make great accompt in the country, foolishly, and without reason, for it is loathsome to such as are not acquainted with it, having a skumnie or froth that is very unpleasant to taste, if they be not very well conceited thereof. Yet it is a drink very much esteemed among the Indians, where with they feast noble men as they passe through their Country. (De Acosta [1590] 1604, 244)

Why so esteemed? While de Acosta, writing more than a half century after Hernán Cortés conquered the Aztec Empire in 1521, still saw no apparent value in cacao, quite a few other early explorers and missionaries had not quite such a negative viewpoint. Bernardino de Sahagún, a Franciscan friar who sailed to the New World in 1529 and spent sixty years compiling native knowledge, produced perhaps the most authoritative reference we have today examining the natives’ suggested health benefits of cacao. His table of illnesses that natives believed could be treated with cacao runs to about one hundred, including the legend that began with Montezuma and never ended—that chocolate is an aphrodisiac. Sahagún seemed to be an early cocoa convert, as he concluded, “This cacao . . . when an ordinary amount is drunk, it gladdens one, refreshes one, consoles one, invigorates one. Thus it is said: I take cacao I wet my lips. I refresh myself” (Sahagún 1577; quoted in Graham and Skoronek 2016, 649). Unfortunately,

Europe did not know about the prolific friar's twelve-volume masterpiece until it was discovered in a Florence library some two centuries later.

A few decades after Sahagún, physician Francisco Hernández landed in New Spain with instructions to document its botanical features. As physician to Spanish king Philip II, Hernández set about to collect native plant species with a pharmaceutical goal: he hoped to find useful medicines unknown in the Old World. He found quite a few, including the cacao tree, and his experience seemed to have been more agreeable than de Acosta's. Not only were the seeds used as coins but also "to make a very agreeable beverage." Hernández recorded that the ground cocoa beans could treat fever or liver concerns and, as a thin paste, could excite the "venereal appetite" (Dillinger et al. 2000, 2063S).

Unfortunately, Hernández's monumental 1576 work ended up tucked away in the Spanish library of Escorial. A few Italian scientists by the early 1600s did have access to some of the text, but generally it did not see the scholarly light of day until much later. But the original did see the light of fire: it was destroyed in a 1671 fire at the library. Fortunately, it had been copied, and the "Rome Edition" of 1651 belatedly brought the work to a public by then well aware of cocoa.

Hernández's recording of the native idea that this strange brownish or reddish beverage could serve as an aphrodisiac attracted prompt attention of Spanish invaders. Bernal Díaz del Castillo, a soldier with the conquering army of Cortés, wrote an early credible account of his experiences in *The True History of the Conquest of New Spain*. Díaz as a witness described Montezuma's feast.

Every now and then was handed to him a golden pitcher filled with a kind of liquor made from the cacao, which is of a very exciting nature. Though we did not pay any particular attention to the circumstance at the time, yet I saw about fifty large pitchers filled with the same liquor brought in all frothy. This beverage was also presented to the monarch by women, but all with the profoundest veneration. (Díaz [1568] 1844, 230)

Díaz is credited with establishing the legend that the great Aztec king drank fifty goblets of chocolate to prepare for sex with his numerous wives. Scholars have since debunked that amazing story, as one would expect, but the appeal of chocolate as a love potion persisted through centuries. Spanish conquerors continued to show keen interest in its possible use to encourage potency for men or enthusiasm for women. In what would become the most famous European introduction to chocolate, Spanish physician Antonio Colmenero de Ledesma said that chocolate "vehemently incites to Venus and causeth conception in women."

That possible benefit was featured in an English translation of Colmenero's book, its meticulously ponderous title reading, *Chocolate; or, an Indian drink. By the wise and moderate use whereof health is preserved, sickness diverted, and cured, especially the plague of the guts, vulgarly called the new disease; fluxes, consumptions, & coughs of the lungs, with sundry other desperate diseases. By it also, conception is caused, the birth hastened and facilitated, beauty gain'd and continued*. The Venetian lover Casanova was purportedly a fan of chocolate, and supposedly the French erotic story-spinner Marquis de Sade employed it to boost enthusiasm for a subsequent orgy, though Sade tended toward the most outrageous

of exaggerations. But he did like chocolate. He made repeated requests for it during his Bastille imprisonment. He also requested cocoa butter, an old native remedy for hemorrhoids (Coe and Coe 1996).

Writers throughout centuries repeated the tales of chocolate's benefits as an aphrodisiac. Louis Lémery in his 1702 *Le Traité des aliments* wrote chocolate could "excite the ardors of Venus." Writing in 1652, hopeful poet James Wadsworth declared:

Twill make old women long and fresh,
Create new notions of the flesh,
And cause them long for you know what,
If they but taste of chocolate.
(Hospodar 2004, 87)

Henry Stubbe, doctor to Charles II of England, wrote an important early treatise (published 1662) in favor of chocolate's medicinal marvels. "I have heard and read discourses of panaceas, and universal medicines: and truly I think chocolate may as justly at least pretend to that title, as any" (Stubbe 1662, 125). He was particularly interested in the claim that chocolate was an aphrodisiac. But he was a bit of a sceptic, writing in an age in which experiments and observations were beginning to overtake library medicine, mostly Galen's work. Stubbe tried chocolate himself, in a variety of preparations, recording the results. He examined it under a microscope. Regarding experiments to assess its qualities as an aphrodisiac, however, Stubbe demurred:

As for chocolate, how effectual it may be herein, I understand not by experience: but since the most amorous nationalities in the world drink it, it is very possible, it may conduce thereunto much. If it be the design of physics to preserve nature, and free her from superfluous collections of humours; and nothing doth the better then [*sic*] chocolate, as far as venery is but the collection and ejection of a superfluity gathered in, and about the testicles: without doubt physicians cannot decline to recommend it. (Stubbe 1662, 142)

Carl Linnaeus himself was convinced. The botanist and physician who established our modern system of taxonomy named the cacao tree *Theobroma cacao* (food of the gods). He included in chocolate's health benefits that it was an excellent aphrodisiac.

The legend is still common. Perhaps today some who promote it lean toward snickers and winks rather than serious research. But in fairness to possibility (if not evidence), the theobromine in chocolate stimulates as does caffeine, so offers a slight increase in energy and perhaps stamina. More clinically, medical research has found chocolate contains phenylethylamine (PEA), the "love drug," linked to physical energy, mood, and attention. A small amount of PEA is produced at moments of emotional elation, elevating blood pressure and heart rate. But no evidence shows PEA in foods is related (WebMD 2021). In any case, the heart-shaped boxes of chocolate many give to their sweethearts on Valentine's Day (marketed beginning in 1868) seem to suggest a tradition that goes back to Montezuma.

If native chocolate customs perhaps did not seriously include its power as a love potion, they certainly did declare its power to treat voluminous other medical

conditions. Sahagún described Aztecs brewing a drink from cacao and silk cotton from the kapok tree to cure infections, and children with diarrhea were treated to a drink from five cacao beans and plant roots of unknown variety (Thompson 2015). But the earliest and perhaps most authoritative evidence comes from a manuscript written by two Aztec natives in 1552. Historians believe it was written chiefly by Martinus de la Cruz, a native physician in Nahuatl (language of the Aztecs). It was translated into Latin by Joannes Badianus, also Aztec. The manuscript describes a large pharmacopeia available to pre-Columbian healers, including significant effects of cacao in various forms. Cacao could treat fatigue, dysentery, gout, and problems with teeth. Flowers of the cacao tree could be used to perfume a bath to restore tired bodies, particularly those of government leaders (Thompson 2015; Dillinger et al. 2000).

But pre-Columbian Mesoamerica focused more on the symbolic, spiritual, and ritual aspects of cocoa that Europeans had no understanding of and, with a few exceptions, little interest in. The traditional native chocolate beverage was rarely sweetened. The bean is naturally bitter. For those Europeans who had not acquired a taste for it, an astringent, brownish or reddish beverage laden with floating fat probably did not look palatable. But medicines were not expected to be.

Galenic medicine was allopathic: its physicians believed treating a condition meant finding a substance that would produce the opposite effect. Health was a body in balance. Disease could be traced to an imbalance in humors. While the system may seem bizarre today, it was modern in the sense that it searched for natural remedies, and not spiritual claims, for disease, and because it emphasized that healthy eating would preserve balance and so good health. Galen's enormous volume of medical writings became the definitive reference for understanding injury and disease. As the physician had amassed practical knowledge based on his service to wounded Roman gladiators, as well as his practical dissection of humans and animals, Galenic authority was unquestioned. He had seen it all, blood and guts not spared. Dissections of cadavers (mostly condemned criminals) continued through the Middle Ages and into the time of chocolate, but not to explore the human body as much as to demonstrate anatomy for medical students (Chapman 2016).

By the 1500s, a thoroughly professional European doctor would have studied at a prestigious medical school, usually the University of Padua in Italy, to master the thinking of Galen and other physicians of antiquity. Every question of health and sickness would be put to the Galenic standard. Many physicians during the period also became clerics or joined monasteries, as it was presumed that a good doctor would tend to both physical and spiritual needs of a patient. As medicine and religion during the early chocolate period were closely linked, it is reasonable to presume chocolate would reach Europe both as a medicine and through the pan-European Catholic monastery system.

At the dawn of chocolate's appearance outside of Spain, however, the Galenic system already had developed a shaky base. Doctors began to discover that quite a bit of Galenic anatomy actually was not accurate. They surmised that much of it may have been based on examination of animals, not humans. In 1628, William Harvey published his treatise positing that blood, instead of a production of the

liver that was consumed by the tissues, as Galen taught, actually circulated through the heart and lungs. This was such a radical departure from Galenic wisdom presumed correct for 1,500 years that it saw slow acceptance among medical authorities. In 1636, Harvey, as doctor to King James I, spent a year traveling around Europe to promote his revolutionary idea to Continental physicians.

Harvey's departure from centuries-old wisdom served to lead the European medical community to further skepticism. The Galenic system was already under scrutiny not only by anatomists but also by humor-based medical practitioners. Chocolate served to intensify the skepticism. Galen could not have known about chocolate, perhaps sadly. The problem medically with chocolate was that it just didn't fit the neat Galenic system.

The cocoa bean, as astringent, would be categorized as cold and dry. The fat in chocolate, called cocoa butter, was oily, so it should be categorized as hot and wet. But how can one substance straddle two categories? The first physician (that historians are aware of) who seriously examined the paradox was Hernández, who said in 1576 that chocolate should be considered hot and moist because it encourages weight gain. But it also, as the Aztecs claimed, dissipates fever, so it that sense it is cold. His verdict? Moist and cold. That response would have confused Galenic physicians, but his work did not become familiar to most doctors of the era. Augustín Farfán, an Augustinian doctor practicing in New Spain, published a 1579 treatise that recommended chocolate for several health problems. He warned, however, that chocolate thickened the blood (hot and moist) and encouraged laziness (Harwich 1992).

Of the earliest physicians whose work was well known to the medical community of the era, Juan de Cárdenas in Mexico City published his evaluation of the chocolate paradox in 1591. Examining the substance in great detail, Cárdenas determined that raw cacao damaged the humoric balance of the body. But when roasted and mixed with ingredients favored by natives, it may have an effect of being both cold and dry and warm and moist at the same time. The substance could be divided into three aspects. The cold, dry, earthy aspect could cause anxiety and possibly heart concerns. The grease-like aspect could be warm and oily, and so cause weight gain. The third was warm and penetrating, heating the body, causing perspiration and sweat (Grivetti and Shapiro 2009, 69). The "malice" of cacao could be eased by adding vanilla and ear flower (*Cymbopetalum penduliflorum*).

The addition of ear flower, popular still as an aromatic spice in Mesoamerica, also was mentioned by Sahagún, who cautioned against adding too much, as it could cause drunkenness. In another early description of cocoa, Sahagún observed that the Aztecs used the drink to treat fever. Of course, the natives knew nothing about the humoral system, but their use may have suggested its category to Sahagún, who pronounced it "cold in nature" (Albala 2007). However, Sahagún's (1577) 2016 manuscript account probably would not have been known to Europe's physicians, as it was not published until the nineteenth century.

A physician based in Mexico at the end of the 1500s, Cárdenas may have been one of the earliest to extensively examine the humoral properties of cacao because he feared colonial distrust of a "pagan" beverage. Scholar Marcy Norton observed

that Cárdenas showed concern about Spanish doctors who “condemned everything about chocolate and suggested it was becoming associated with idolatry in strongly Catholic Spain” (Norton 2006, 689). Cárdenas possibly hoped to make cacao more acceptable to the humor-based European medical community by reconfiguring it in those terms, instead of basing it on the benefits as described by native uses. But, again, historians do not know if European physicians were aware of his work. It is unlikely that it was circulated beyond New Spain (Jones 2013).

Bartolomé de Marradón, a Spanish physician who in the early 1600s traveled at least twice to Central America, weighed in with skepticism. He observed with concern the growing popularity of chocolate both in New Spain and the Old World. His made-up dialogue to summarize the benefits of chocolate pronounced it potentially “obstructive,” and his concern focused heavily on the damage to health that chocolate drinking could cause.

Santiago de Valverde Turices in Seville University took up the humoral question with an extensive treatise in an effort to establish a fit. But the paradox of chocolate could not be satisfactorily explained. It was becoming clear that this new food could not reasonably be accommodated in the Galenic system of medicine. Chocolate became one more nail in a slowly constructed coffin that would end with the death of the ancient medical canon. But for a while the medical profession kept trying, as they had no alternative to Galenic medicine.

Antonio Colmenero de Ledesma combined the tradition of physician and clergyman as part of a Jesuit mission to Mexico. In 1631, he published *Curioso Tratado de la Naturaleza y Calidad del Chocolate*. The book, really an extended pamphlet, reconsidered the long debate regarding the humoral qualities of chocolate and suggested ways to prepare the unfamiliar drink. Colmenero had apparently been persuaded to favor chocolate after his arrival in New Spain when his request for a little water as refreshment was answered instead by a gourd of chocolate. He found it satisfying and so apparently decided to look more closely at what he called the “Indian drinke.” Colmenero disagreed with Marradón’s gloomy considerations of chocolate. He said it could be beneficial for three things: to enable weight gain, to stimulate the nervous system, and to improve digestion (Colmenero de Ledesma 1652).

Colmenero acknowledged other physicians who pointed out the Galenic paradox of chocolate, both cold and dry and hot and moist. But he said that while detractors believed that “two contrary qualities cannot be *in gradu intenso*, in one and the same subject,” he disagreed. He pointed out that chocolate actually is two substances, the fatty and the solid, so it could have two qualities.

To Colmenero, it meant, instead, that chocolate was balanced and so promoted good health under the humoral system. He argued that Galen himself had noted some substances could have two different qualities, such as milk. Colmenero further recommended that sugar could temper and conserve cocoa, and cinnamon could make it lighter on the stomach. Cinnamon and sugar were unknown to the New World, although honey was occasionally added to one of the many chocolate-based concoctions available to the Aztecs and Maya.

The chocolate of the Americas had been familiar to European colonizers and missionaries by now for more than a century. But its spread to Spain moved slowly,

as did its acceptance in the rest of the Continent. Colmenero's book accelerated change. The first widely known authoritative text on cacao and chocolate, his work hit Europe just as chocolate was emerging as a widely available, if expensive and exotic, New World beverage. Colmenero's descriptions, recipes, and application to traditional medicine so encouraged Europe's growing chocolate habit that it became a Renaissance best seller. It offered a strong medical justification for a product that was particularly attractive to those who sought it more for its slightly stimulating and, sweetened, attractive flavor. Classified as medical literature, the book was translated into English in 1640, French in 1643, Latin (then the language of medical scholarship) in 1644, Italian in 1678. Colmenero became the century's standard reference for chocolate's benefits and qualities. Most of the growing stable of medical experts who published their own texts examining chocolate either copied Colmenero almost verbatim or heavily referred to his text.

Stubbe in his 1662 work, *The Indian Nectar; or, a Discourse Concerning Chocolata* credited Colmenero for much of his information. But Stubbe was not convinced the humoral conundrum had been put to rest. He also seemed to believe chocolate was slow in spreading through Europe because on first taste it was "none of the most pleasant." Unsweetened it is astringent and somewhat bitter, and so it was no surprise that the first Europeans introduced to it did not care for it. As for its humoral qualities, Stubbe found the cacao bean itself "by temperament cold, and dry, and therefore hath astringent parts, with which it begattes obstructions." But it cools the liver, "or any other inflamed part." On the contrary, however, cocoa butter was hot and moist, and "multiplies blood, and vital spirits, and enables men to labor" (Stubbe 1662, 35, 37).

After experimenting himself to test those contradictory qualities, Stubbe seems to throw up his hands in exasperation: "Fine, let men debate eternally the temperament of the nut . . . but have never controverted its incredible nutritive faculty. It is multi alimenti, yields plenteous nourishment, saith Hernandez" (Stubbe 1662, 43). Stubbe added his experiments showed that not only did it *not* cause constipation—it caused the opposite. A few years later, in 1672 physician William Hughes concluded that as a drink chocolate was "approved of by the Learned Physitians, and sufficiently recommended to the world" (Hughes 1672, 115).

But the medical debate was never firmly put to rest as long as humoral medicine stood as Europe's standard. But it became more and more clear by the 1700s that the problem was not how to classify chocolate. The problem was the Galenic system itself. Still, humoral medicine survived until well into the nineteenth century, when modern pathology of Rudolf Virchow in 1858 finally closed Galen's voluminous but now discredited book of humoral medicine.

The growth in popularity of chocolate throughout Europe and North America had as a beginning its value as medical treatment. This reflected its common native use also. As a medicine chocolate served as well to plausibly explain and provide a mantle of respectability for a suspicious new food produced by native "pagans." The new beverage of chocolate in Christian Europe required rationalization to warrant ecclesiastical approval, never mind that by the time of Colmenero's book it was already soaring in popularity among high society. The bitter taste could be tamed by roasting techniques and by adding sugar and spices. Chocolate moved away from its start on the pharmacist's shelf. Soon it was featured in chocolate and

coffee houses popping up around the Western world. “Medicinal purposes” served as handy defense to the more conservative consumers who worried about this new beverage’s stimulating effect and possible aphrodisiac qualities, despite a growing reputation of chocolate and coffee houses as places of gambling, debauchery, and anti-government intrigue, particularly in London.

By the 1660s, chocolate had become familiar among Europe’s elites. London diarist Samuel Pepys observed that his favorite cure for a hangover was a morning chocolate. In Paris, Le Procope restaurant was established by Italian Francesco Procopio dei Coltelli, from Sicily, in 1686. It featured chocolate, although as early as 1669 Procopio was already doing a brisk business selling chocolate (*Mercure de France* 1736; the restaurant still

exists). In London, White’s Chocolate House opened a bit later, 1693, also by an Italian, though chocolate was well established in England before that (White’s still exists, though it has become an exclusive private club). Advertising for chocolate can be found as early as 1657 (Grivetti and Shapiro 2009). In 1675, English king Charles II actually issued an edict closing coffee and chocolate establishments for their “bad influence.” The order was ignored. By 1700, chocolate had become a common, though still expensive, beverage, often consumed under presumption of good health. In 1687, French physician Nicholas Blégny recommended chocolate with vanilla, long known as “health chocolate,” and in 1698 Nicolas Lémery was delighted to report that chocolate could “resist the malignity of the humors” (Harwich 1992, 94).

By the eighteenth century, menus indicated chocolate’s use had been widened into a familiar ingredient for desserts favored by aristocracy and a typical morning drink. It had not, however, been abandoned by the health conscious. A 1729 treatise by Tuscan physician Giovanni Batista Felici unhelpfully warned that chocolate aficionados shortened their lives. He counseled against adding the humorically hot drugs like cinnamon, vanilla, pepper, or cloves to what he thought was already a “hot” food. Perhaps, as many believed at the time, it could cure tuberculosis (called consumption until the twentieth century). But every medicine has side effects, and so Felici noted that while chocolate may cure consumption, it



Samuel Pepys, author of a diary describing life in London in the 1660s, referred several times to his affection for chocolate as during this period it grew to become a familiar breakfast drink of English aristocracy. (Library of Congress)

does not mean chocolate is good for you (Coe and Coe 1996). On the other hand, Linnaeus argued that not only could chocolate build desirable weight but also it could treat lung and muscle diseases, hypochondria, and—as a widespread problem of a horse-riding world—cocoa butter was a good treatment for hemorrhoids. The medical arguments for chocolate remained powerful. A food procurement list from a hospital in New Spain dated September 1748, for one month, included requirement of 10,863 tablets (solid form) of chocolate. Colonial pharmacists in the North American colonies advertised chocolate for health as early as 1712. Advertisers before the Revolution included Benedict Arnold, who featured chocolate in his colonial apothecary shop (Grivetti and Shapiro 2009). Chocolate by the 1700s was touted as medicine to treat just about everything, although clearly, as a Vienna chocolate makers guild noted in 1744, “for pleasure drinking and for medicinal use” (Wilson and Hurst 2012, 77).

The beginning of the 1800s launched a chocolate revolution. It turned what was once a rather expensive beverage for elites into a moderately priced treat for everyone. Jean Anthelme Brillat-Savarin, whose 1825 *The Physiology of Taste* became the century’s most influential book on cuisine, praised chocolate for health. He wrote it “restores weak health” and “supports the body without dulling the mind” (Brillat-Savarin [1825] 1848). By good authority one could enjoy a treat and stay healthy at the same time.

Discredit of humoral medicine by the mid-1800s might have put a damper on claims of chocolate for health, but a review of chocolate advertising throughout the rest of the century shows the claims continued. A variety of substances would be added to address specific conditions. Vanilla still claimed to be necessary for “health chocolate.” Other additives, such as widely advertised iron-infused “feruginous” chocolate, were supposedly recommended by Paris physicians “to cure pale color, stomach aches, discharges, weaknesses, and sicknesses of childhood” (*Constitutionnel* 1843, n.p.). In England, entrepreneurs of the Quaker religion who were by law limited from some business pursuits jumped on chocolate. Not only could they work within the law, but they could promote an alternative to alcohol at a time when crusades were growing in opposition to strong drink. Some of the most famous figures in industrial chocolate, Cadbury, and Fry and Rowntree, were Quakers. Milton Hershey in the United States grew up in a related sect, Mennonite, and reflected some of the same values of industrial paternalism.

Toward the end of the nineteenth century, however, as chocolate became a ubiquitous and cheap treat, its claims to health diminished. Milk chocolate, a milder, sweeter beverage or bar, became far more popular than the old-style, slightly bitter dark chocolate. American milk-chocolate king Hershey did argue as late as 1900 that his product’s “food value cannot be excelled for either young or old.” He suggested virtuous consumption as an alternative to alcohol, an appeal to a strong U.S. temperance movement of the early twentieth century.

But modern milk chocolate clearly was not the same drink that had excited earlier physicians. Advertising claims for health chocolate were disappearing by the twentieth century. Chocolate was a sweet treat, no less but also no more. And as milk chocolate came to far outsell dark chocolate, consumers and nutritionists began to criticize it as heavy on sugar and obviously fattening, with little nutritive

value. It could encourage cravings, perhaps, but that would be a bad thing. Virtue demanded denial, at least in those of a puritanical streak common in U.S. society. And its continued reputation as an aphrodisiac? Not exactly a plus for many critics. Chocolate after World War II had gone from medicine to menace. Milk chocolate's high sugar and hydrogenated oils or other additives could cause tooth decay, gum disease, acne, obesity, and was associated with an unhealthy lifestyle. It was a treat for kids. If they must.

The growing concern of chocolate as unhealthy hardly tempered its popularity. Nutritionists always accepted chocolate's usefulness as an energy source, one reason it became a standard part of wartime soldiers' rations. Extensive advertising by enormous industrial chocolate companies established the food as a bedrock cultural touchstone in Europe and the United States—although in Mesoamerica it generally kept its traditional role as medicine and ritual. Elsewhere, chocolate was a treat for everyone, a gift for special occasions, perhaps a symbol of affection. But nothing more. It seemed that the centuries of extravagant health claims were finally put to rest. But controversies over chocolate were hardly over.

In the early 1980s, nutritionists reexamined some old chestnuts against chocolate, particularly the presumed wisdom that chocolate caused acne and tooth decay. Common observations had led parents to conclude this: children ate a lot of chocolate candy, and they also had a lot of acne and tooth decay. There must be a link.

Except researchers found there was not. In fact, chocolate's cocoa butter appeared to coat and actually serve to protect teeth from decay. Urban legend was slow to change, however, and even in 2021 many people presumed chocolate should be avoided for these risks. They were not exactly wrong—the problem was that kids' chocolate often contained so little cocoa solids, and so much sugar, that it was not even fair to call it “chocolate.”

In 2005 Mars Wrigley, the world's largest chocolate manufacturer, established Mars Symbioscience, a foundation to encourage cacao research. It and other large chocolate multinationals have since the 1980s poured money into scientific studies on the health benefits of chocolate. Mars funded a nutrition research chair at the University of California Davis, a world center for university-based research on cacao. Studies on health benefits ballooned after an encouraging 1997 work that investigated a possible connection between the near-absence of high blood pressure among Kuna natives and their chocolate consumption. The Kuna live on a Caribbean island off the coast of Panama. They favor chocolate, drinking more per capita than probably any other community in the world, five cups a day. When Kuna natives moved to the mainland, however, with a custom of much lower chocolate consumption, they lost the protective effect. Research found that flavonoids in chocolate synthesize into nitric oxide and so cause vasodilation. A flavonoid-rich diet is known to lower risk of cardiovascular disease (Hollenberg, Fisher, and McCullough 2009; Wilson and Hurst 2012). Could chocolate contribute to heart health and lower the risk of diabetes and even cancer? The search was on.

Hundreds of encouraging studies, many funded by big chocolate industries, poured into the mass media. Many showed that chocolate was even more complex than it seemed to the Galenic doctors of the past. As an antioxidant presumed to inhibit free radicals that attack health, chocolate featured polyphenols, including

the flavonoids epicatechin, catechin, and procyanidins. These are also present in many fruits known to lower blood pressure, as well as wine, the famous “French paradox.” Moreover, chocolate contains trace elements necessary for good health, including magnesium, iron, zinc, phosphorus, copper, and vitamins. While cocoa butter is a fat, it is mostly stearic acid that studies have shown does not affect cholesterol. In fact, its oleic acid content may have a positive effect on lipid levels (Magee n.d.; Squicciarini and Swinnen 2016).

Some research has shown regular consumption of dark chocolate can lower risk of Type 2 diabetes, lower blood pressure, and help people think more clearly. As for the old concern of obesity, some research has shown people who regularly eat dark chocolate are actually less likely to be overweight. Its low glycemic index makes it a reasonable treat for diabetics, as long as it does not have a large amount of added sugar. Chocolate can have up to 25 grams of sugar, a weighty amount, though still less than the average 39 grams in soda. And some chocolate has much less. Consumers can examine the list of ingredients. If sugar is listed first, one might avoid it for health. And for vegans, pure dark chocolate contains no animal substances.

Chocolate contains a mild stimulant well known to the ancients and an attraction (or sometimes a concern) to centuries of Europeans. Its stimulating qualities, however, are not based on the caffeine we find in coffee, tea, and soft drinks. It contains a little caffeine, but mostly it is based on the alkaloid theobromine, also contributing to chocolate’s mild bitterness. The stimulating effect is usually considered an attraction, and a 1990 study apparently disproved the argument that theobromine, serotonin, and phenylethylamine in chocolate may cause migraines as coffee sometimes does. It may be the effect of theobromine or phenylethylamine that also is released during intimacy that is at the origin of chocolate’s centuries-old reputation as an aphrodisiac. But modern research has not found a practical connection. It has found that it is the theobromine that makes chocolate toxic to dogs (Sandborn 2015).

A common belief is that chocolate can be a concern because it is addictive. The idea dates from the dawn of chocolate’s introduction to Europe; José de Acosta in 1590 observed that “Spanish men—and even more the Spanish women—are addicted” to chocolate (Wilson and Hurst 2012); a 1590 English version translates de Acosta’s description as “very greedy of this chocolate” (De Acosta [1590] 1604, 245). A poll showed 50 percent of women in the United States report chocolate cravings as a premenstruation symptom. About 45 percent of people reported craving chocolate when depressed. Chocolate contains tryptophan, encouraging calm and pleasurable feelings that may address depression (Squicciarini and Swinnen 2016). But while caffeine addiction is a fact, caffeine in most chocolate is so minimal that it can be compared to what is left over in decaffeinated coffee. Chocolate cravings are less likely to be found among women not from the United States, suggesting that the idea is related to cultural norms and not physical addiction. Some researchers suggested Americans are actually craving the sugar that is so high in many mass-market chocolate bars (Belluz 2018). Research did show that chocolate can cause heartburn, and as people have known for centuries, for the good and the bad of that, it is a diuretic.

Based on these optimistic studies, the popularity of high-quality dark chocolate since 2014 has been growing. Most research clearly emphasized that health benefits were highest in dark chocolate containing 70 percent or more cocoa solids. Milk chocolate could be beneficial but only in bars also high in cocoa. Many milk chocolate products have as little as 10 percent cocoa solids.

Continued research over the last few years, unfortunately, has called into question some of the exciting health claims that seemed too good to be true—a popular treat that is also good for you. First, we know chocolate is not all alike, and so its health effects also vary. Common sense would tell us that the Snickers bar we love is probably not a health food. Mars, its manufacturer, actually agreed. While it has funded health-based research, the multinational has publicly emphasized that it does not consider its mass-market products to be health foods, but a treat. Mars has discontinued funding studies into the health of chocolate, as recent research casts doubt on earlier hopes. While cacao begins with high flavanol content, the company emphasized that after processing little of that may be left (Nieburg 2018). Skeptics have noted research funded by the industry tended to produce more favorable studies, and that benefits of chocolate may require a daily dosage much higher than reasonable—up to twelve 100 gram (4 oz.) bars of dark chocolate or fifty of milk chocolate (Fleming 2018).

Milk may limit action of polyphenols, part of a general recommendation that health chocolate is dark chocolate. But few polyphenols may be left anyway, as processing can decrease them up to 80 percent. Research in 2021 indicated that during fermentation enzymes break apart polyphenol molecules and, as a result, chocolate actually contains few polyphenols (Clark 2021). Some evidence showed cacao nibs, the crushed bean, can be better for health than the chocolate itself, and they also have fiber not found in chocolate. Consumers can add nibs to cereal or yogurt, but they do not taste like actual chocolate.

The European Food Safety Authority in 2013 approved a health statement that a daily intake of 2.5 grams of dark chocolate containing 200 milligrams cocoa flavanols “contributes to normal blood circulation by helping to maintain the elasticity of the blood vessels” (Nieburg 2018). But a 2016 study suggested that needed revising because the specific flavanol, epicatechin, is needed for that outcome, and 200 milligrams of flavanols contains only 45 milligrams of epicatechin. An actual 100 gram bar of dark chocolate typically contains between 50 milligrams and 100 milligrams of flavanols, while milk chocolate has only 15 milligrams. Note 100 grams of dark chocolate also contains about 520 calories. In 2015, Mars, backing away from health claims, suggested that the manufacturing process only leaves a small amount of flavanols (Nieburg 2018). The COSMOS trial (COSMOS study 2020) has sought to find a definite answer to the value of cocoa flavanols but is relying on daily supplements instead of chocolate bars. This is because the 4.75 ounces (135 g) of dark chocolate necessary for 750 milligrams of flavanols weighs in at a whopping 750 calories, or nearly one-third of the daily recommended calorie intake for adults. In early 2020, results were still pending (COSMOS study 2020).

So after nearly five centuries, we still are in a quandary: is chocolate good for you, not good, or doesn't matter? Hopes of chocolate lovers jumped in the 1600s and 1700s, fell in the 1800s to mid-1900s, and again jumped in the twenty-first

century. Now we are again not certain. We do know this for sure. Chocolate increases mental alertness as does coffee and tea, and for the same reason is also a diuretic. If weight gain is your goal, chocolate will probably accommodate. Cocoa butter extracted from cacao is favored for cosmetics and skin treatments. Chocolate may offer antioxidant properties but only the real thing, 70 percent or more cocoa solids, and you won't find that in your average candy bar. But one thing is certain: a chocolate treat will make us happy and that alone should be a worthy health benefit.

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Bitter History

Slaving for Chocolate

Producing a cup or bar of chocolate requires a lot more effort than many other agricultural products. A cacao pod just off the tree gives little hint that it could be useful in any way beyond a quick snack of the sweet pulp before it starts to ferment in the tropical heat. Native South Americans apparently happened on the possibility that roasted seeds could become palatable, but even then, it took a lot of work.

The tedious steps behind production of the pleasant product we feature today for special gifts, celebrations, and daily snacking has not changed. Machines have taken over the more miserable grinding and winnowing, but still a worker in a hot climate wielding a machete carefully detaches the pods, breaks them open, extracts the seeds, ferments the seeds, and ships sacks weighing 100 pounds (40 kg) or more for roasting and winnowing the shells. Nibs of the broken beans are ground to produce a paste that may be further processed, mixed with other flavors, or consumed straight as a beverage.

Most of us, not surprisingly, neither have the expertise nor the stamina to produce our own chocolate. It was the same for the early Spanish who first set foot in the New World and soon became accustomed to their cup of cocoa. Pre-Columbian Aztecs constructed a network of trails for workers to bring the beans from cacao-producing areas in the south to the capital. Ideal cacao conditions were found in Pacific coast regions of modern Guatemala and adjacent areas, including famous Soconusco in today's Mexican state of Chiapas. It was from there that the best cacao could be grown, and so Aztec rulers waged wars to control the prime regions. As victors they required cacao for tribute. Probably the Maya civilization did the same thing. From its earliest history, cacao was a precious luxury, like gold or silver, a focus for violence, oppression, and tribute. But as it becomes valuable only after processing, it is perhaps not surprising that early colonizers would rely on slaves and coerced labor to do the work. What is perhaps more surprising is that the brutal industry of cacao is not history. It is still part of the industry today.

Spanish conquerors beginning with Hernán Cortés himself were not flooding Central and South America out of curiosity or a quest for learning. A few mostly

Catholic missionaries tried to implement the Crown's ostensible goal of spreading Christianity and made an effort to document eroding native language and customs. But most colonizers were asking one thing: how could the New World make them rich? Cortés saw early on that even if he did not think much of it, the natives themselves seemed to value cocoa beans. He and other colonizers appropriated the old Aztec tribute network from the Soconusco region. Evidence indicates that the Aztecs were expecting an annual 200 loads of 24,000 beans each (Presilla 2009), and so the Spanish conquerors apparently deemed that a nice amount for themselves.

Documents from shortly after the conquest, 1548, indicate Soconusco tribute to the Spanish was 200 *cargas*, each *carga* comprising 24,000 beans (Mcanany and Murata 2007; Leissle 2018). When Soconusco cocoa gained fame as the highest quality bean of Mesoamerica, demand grew not only within the New World but also in Spain. The Spanish Crown and church were becoming desperate for income after decimation of war and inflation. A new source of money could be cocoa beans, through tax and sale. To produce it cheaply, Spanish authorities set up an *encomienda* system benefiting both church and state. The requirement of Soconusco native tribute rose to 400–600 *cargas* in 1571, 650 in 1576, and 1,133 by 1613 (Forrest and Najaj 2007). The *encomenderos* were awarded tracts of native land to exploit, and its native people were forced to work to maintain the demanding tribute. In theory, the natives had relative freedoms similar to feudal vassals. In practice, they worked like slaves. Cortés as one of the first and most famous *encomenderos* held absolute rule over 115,000 natives, including forced demands for construction, mines, plantations, or sexual favors. He had the right to sell his workers to other *encomenderos*, in effect establishing the first system of slavery that became endemic in New World cacao operations. In addition to the church as a whole benefiting from the tribute, individual clerics living in America could build on the ritual by requiring natives to pay personal tribute in food offerings, including cocoa (McNeil 2006).

Spanish Dominican friar Bartolomé de las Casas, shocked by the abuses of the system, launched an aggressive campaign to curb its brutal excesses. Explicit attempts to enslave the native population faced formal church prohibition in 1537 by a papal bull (decree) that threatened excommunication of any Christian who enslaved native people. But *encomenderos* by law were not formally slave owners. Systemic abuse endured as cacao became a crop so profitable that more and more native workers were required to produce the growing export (Frydenborg 2015; Pope Paul III Encyclical 1537).

By the end of the 1500s, the jewel of premier cacao production Soconusco was losing native population at a rate that made it impossible for owners to bring in sufficient cacao harvests. Overwork, wars, brutal treatment, and disease brought native mortality rates in the region to a nearly unimaginable 95 percent. This reflected native mortality rates throughout Central and South America during the early colonial period, however—80 to 90 percent of native peoples perished, most commonly of diseases like smallpox that Europeans brought with some immunity of their own. Slightly more than a century after Columbus last sailed, the exploitation of native peoples for cacao production was becoming unfeasible. There were few left to exploit. But Europe beyond Spain was discovering the new and soon fashionable drink. Cocoa was beginning its first boom in the seventeenth century. By the late

1500s, Guatemala and other Mesoamerican areas had become the primary producer of the world's cocoa beans as Soconusco production began to fail. But with fewer and fewer workers there too, and trees beset by disease, Central American cacao began to fall dramatically behind demand. Orchards were abandoned with no natives to tend the trees. Production would have to come from somewhere else (McNeil 2006).

Recent research has identified South America as the origin of *Theobroma cacao*, specifically the upper Amazon basin. But by the time the Spanish arrived in the early 1500s, it was of little native interest in contrast to its importance in Central America. In 1532, the Spanish moved into Ecuador and Peru, with Francisco Pizarro conquering the Inca capital at Cuzco. Colonizers discovered cacao growing wild in the Guayaquil area near the Pacific coast of modern Ecuador. The pods looked different from the familiar Mesoamerican product, however, and so were called “foreign” (forastero), as opposed to “native” (criollo). Of course, what the Spanish called forastero were native to Ecuador and Peru as part of the Amazon basin cacao that soon saw exploitation by the Jesuits. But these cocoa beans, the Spanish thought, were inferior to what had become their Mesoamerican favorites. They were supposedly more bitter. Still, with burgeoning cocoa demand, the encomienda system gave large tracts to conquerors who again effectively enslaved the local population for tribute in cacao. The words “forastero” and “criollo” have come down to us as major cacao varieties, although recent research has in fact concluded forastero is ten separate genetic clusters, and so today we should probably abandon the term (see the essay on the **Natural History of Cacao**).

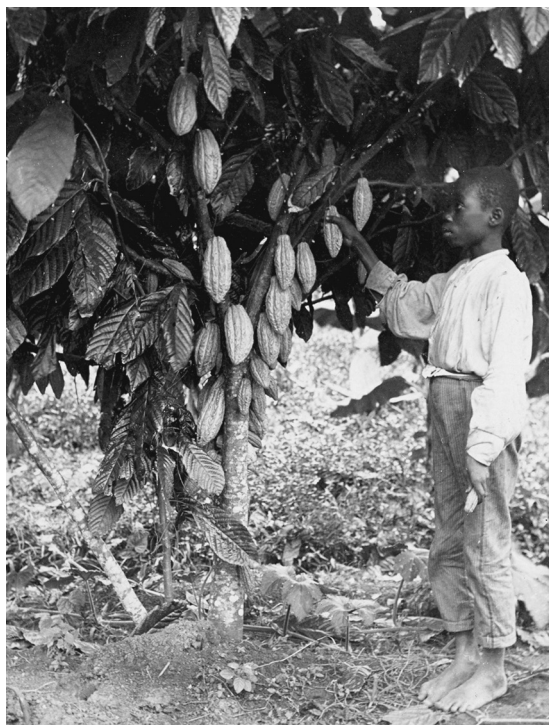
Venezuela, however, became a new alternative to Mesoamerican cacao more attractive to the growing sophistication of European tastes in the 1600s. Europeans who at the time evaluated cocoa by origin, as with wine, believed the cocoa from the areas around Caracas was almost as good as Soconusco, with Tabasco region cocoa taking second place, then Venezuelan. Considered the lowest of quality was Guayaquil, supposedly needing a lot more sugar to overcome bitterness. By the 1600s the Spanish Crown tried to establish a monopoly on cocoa exports centered in Venezuela. But Dutch and English traders successfully raided Spanish ships all along the Caribbean for silver and cacao. In 1634, the Dutch captured the Spanish-controlled island of Curaçao. It set up a secure post for leading raids on Spanish cocoa shipments to break its monopoly.

Both sides, however, faced a common problem. Attempts to coerce work from natives in the south fared no better than in Mesoamerica, as they too were soon exterminated by violence, overwork, and disease. The solution to a labor shortage for production of cocoa, along with sugar, cotton, and tobacco as New World commodities popular in the Old World, was to find someone else to do the grueling work. The fateful answer would come from Africa.

While soon after conquest the pope forbade Europeans from formally enslaving native people in the New World, he said nothing about African people. In what would become the United States the first slaves landed in 1619. We can trace a far earlier date for arrival of the first African slaves to the Americas. It may go back to the very beginning: Columbus possibly carried slaves on his 1492 voyage. The European slave trade dated from decades before that, and so we can expect that the Spanish brought African slaves to Mesoamerica as early as 1537, the date of the papal bull forbidding American native enslavement. Friar Las Casas championed

an end to native slavery but did not argue against using Africans as replacements. Evidence shows the Portuguese brought their first slaves from Guinea to Brazil in 1538. People in the United States presume their forebears in North America imported large numbers of African slaves, and they would be correct. But it was only 5 percent of the total number of slaves who came to the Americas during the 350 years of the slave trade. Brazil alone absorbed 40 percent (Walker 2007). Africans came first to work the lucrative sugar plantations but almost as commonly to work the nearly as lucrative cacao plantations. No European colonial nation is without stain. France, the Netherlands, Spain, Britain, Denmark, and Portugal: all imported African slaves to work cacao and chocolate, as well as other commodities, to create the burgeoning wealth of Europe in the 1600s through the 1800s.

French imported slaves to work the cacao plantations in the colonies of Martinique and Guadeloupe, with the principal French slave ports of Nantes and Bordeaux becoming wealthy on the three-way trade. Most French “Caracas” cocoa actually came from these two islands throughout the 1700s (Coe and Coe 1996). France banned slavery in 1794; Napoleon reestablished it in 1802. It was permanently abolished in 1848. The Dutch brought slaves to Curaçao after the Dutch West India Company in 1634 took possession from the Spanish. Two years later, the Dutch acquired the Portuguese colony of Gold Coast (now Ghana), opening the door to the Netherlands as one of the world’s leading suppliers of slaves. It abol-



Per the stereo card title, a worker gathering cacao pods in Jamaica. The worker is obviously a child. The date is uncertain, but was published between 1860–1910. (Library of Congress)

ished slavery in 1863, one of the last countries to do so, though implementation took many more years (Klooster 1994; African Studies Center 2020). Spain joined the African slave system to import slaves for its high-quality criollo cacao operation in Venezuela. A rival Spanish cacao operation centered on Guayaquil, near the Ecuador coast, produced a cacao variety then called forastero, perceived in Europe as being of lower quality, but cheap and abundant. African slaves were brought to that coast to replace the South American Indians who could not be formally enslaved, although they could be coerced. Jamaica and Trinidad under English control imported slaves for cocoa production destined for Britain and its colonies, notably in North America. In 1831, enslaved Blacks on Jamaica outnumbered

whites twelve to one; by the end of slavery 800,000 slaves had been imported to Jamaica compared to 100,000 in the second most important British slave colony, Virginia (Dunn 2007).

A slave revolt late in that year was unsuccessful but did encourage London to abolish slavery in 1838. While all these colonial possessions became main cacao producers, Denmark's West Indies island colonies built sugar plantations. Probably some small amount of cocoa also was produced, however, as nearly all islands of the Caribbean produced cacao at one time or another. The Danish possessions that became the U.S. Virgin Islands saw about 120,000 slaves transported mostly from Ghana to the plantations. Denmark abolished slavery in 1848 after a revolt ended the country's plan to phase it out more slowly.

Portugal deserves special attention as its colonial empire was vast, as was its slave operation to harvest cacao, operated by religious orders as well as secular authorities. Portuguese-based slavery also was incredibly long-lived, reaching well into the twentieth century. Its slaves, as most in the New World, arrived by what we now call the triangular slave trading system between Africa, the Caribbean islands, and Europe. The system lasted some three centuries. While recent research indicated trade routes were more complicated than a simple three-way map would indicate (Schmidt n.d.), we do know that it emphasized mostly the colonies of Central and South America to produce an enormous profit for European colonial masters, traders, and economic growth. Between 1532 and 1832, an estimated 12.5 million Africans were shipped to the Americas as slaves. One-third of them came on British ships that supplied other nations' colonies as well. Of the 10.7 million who survived the trip, only 338,000 went to the North American colonies (Gates 2013).

The first stage of the three-way system began in northern European ports, primarily London. Ships left for West Africa with trading merchandise such as cloth, guns, tools, or brandy. African slave dealers searched hundreds of miles inland to capture natives. The men, women, and children were marched under gunpoint to the coast, where they were held awaiting a slaver ship to trade the manufactured goods for captives. The "Middle Passage" from Africa served mostly the Caribbean islands, Brazil, Venezuela, and Ecuador. After slavers deposited the surviving Africans who were auctioned to colonial plantation masters, Caribbean raw goods would be loaded for shipment to Europe. Sugar generally comprised two-thirds of the cargo, although cacao beans by the 1600s had become a product of increasing value as cocoa exploded into European popularity. At European ports, the cargo would be offloaded and the cycle repeated.

Death tolls aboard slaver ships or soon after arrival can but shock us today, no matter how much we have become inured to the brutality behind slave-related cacao production. For every captive who reached the Americas alive, evidence indicates about five died either during capture or on board ship. Those who made it had a life expectancy of five to six years; 40–50 percent died during their first year after arrival (Schmidt n.d.). By the early nineteenth century when abolition groups sprang up to demand an end to the brutal trade, everyone in Europe and North America had to acknowledge that the appealing chocolate beverage they enjoyed for breakfast, snack, or party had been produced with

slave or coerced labor. That knowledge did not, however, seem to curb the popularity of cocoa.

We examine Portuguese cacao production separately because its colonial policy in Brazil and later on in the Chocolate Islands not only came to dominate world supply but also perpetuated an extensive system of human coercion that became tied to religious orders operating there. Shift of cacao production from its origins in Soconusco and surrounding areas to South America began with the Spanish who were unable to match rising demand by the end of the 1500s. Until the mid-1600s, the Mexican market continued to be supplied primarily from trees around modern Guatemala. At the beginning of the century, its annual yield was between six and nine million pounds. It would fall to 1.5 million by the end of the century (Alden 1976). Labor shortages and cacao diseases in the area led Spanish rulers to realize they could not expand an increasingly profitable cacao trade without searching for new territory. They moved to Ecuador and Venezuela. But the enormous territory of Brazil since 1500 was a colony of Portugal.

Portuguese cacao production came a bit late to the New World. Portuguese General Vasco de Mascarenhas as viceroy of Brazil in 1665 asked a Jesuit missionary about the possibility of introducing cacao to Bahia, location of Brazil's colonial capital (today called Salvador). Jesuit missionaries had for several decades been active along with Franciscans in what were then remote areas near the Amazon River delta around today's Belém (Alden 1976). It was some 1,240 miles (2,000 km) from Bahia. The Jesuits had been interested in cocoa production and shipping since at least 1634. We can conclude this based on documented evidence from a lawsuit for lost cocoa indicating some of a Jesuit cocoa shipment was bound for Rome (Norton 2006). Jesuits, a Catholic order founded in 1534 as the Society of Jesus, grew to become both avid chocolate drinkers and wealthy traders who managed cacao operations in Chiapas around Soconusco (95,000 trees by 1694) but were also moving to Brazil. As exploring missionaries, they discovered cacao trees growing wild in Amazon rainforests of the northeast. It was a free cash crop as natives there themselves didn't generally drink cocoa. By the late 1500s, Jesuit missionaries were directing teams of natives in canoes departing from Belém to search the jungles for valuable cacao pods (Alden 1976; Walker 2007). The lucrative wild harvest was challenging, however, as it was difficult to coerce natives to work for free in remote areas where they could easily run away or refuse to harvest. The order came to rely on the same workers as secular cacao plantation owners had found—slaves. But enslaved labor did not lend itself to harvest parties bushwhacking through jungles, and so in addition to slaves and compelled workers, they resorted to paying local labor. It was an inefficient way to harvest cacao. Nevertheless, by the early 1730s, a contemporary estimate put Jesuit workers as regularly harvesting about 1.5 million wild cacao trees.

Plantations, however, served as a more efficient system for cacao production. A slave force or compelled workers could be more easily controlled. Jesuits established cacao plantations in Paraguay as well as Maranhão and Bahia in Brazil. Cultivated cacao in Bahia particularly proved profitable; the colonial capital of Brazil already had a supply of slaves working sugar plantations. But the competition of Jesuit wealth built on its cacao and spice operations in Brazil was

becoming more and more of a concern to the Portuguese government. A 1734 document placed Jesuit cacao harvest at up to 427,200 pounds from all sources. Their domination of the local working population annoyed colonial settlers. Accused of damaging the interests of the state and the Crown, in 1759 the Jesuits were expelled from Portugal and Portuguese colonies.

The Portuguese government took over the Jesuit cacao operations. Wild cacao was still gathered until epidemics and economic dislocation ended the practice by the 1800s. Cacao moved to production mostly on plantations. While the Jesuits were chased out, cacao production hardly came to an end. Brazil cacao exports reached 10 percent of world production by the time of the Jesuit expulsion. It grew to a larger and larger global share through the next century and a half, as Bahia plantations relying on extensive slave labor grew to be concentrated mostly into a couple dozen large plantations owned by elite families. A few smallholders did continue to harvest cacao, but the system did not change: many of them also owned a slave or two. Enormous profits from slave labor grew the capital, Salvador de Bahia, to become the largest importer of slaves in the New World: from 1538 to 1850 an estimated 3.5 to 5 million slaves moved through the port (Walker 2007). Worldwide demand for the area's cacao, along with sugar and tobacco, turned the city into one of the richest in the New World. Slavery was abolished in Brazil in 1888—the last Western Hemisphere country to do so. Compelled labor replaced it, however, in effect making workers slaves. Through much of the twentieth century, Brazil continued to be a top world cacao producer until fungal disease brought down the plantations just a few decades ago.

The story of the Portuguese, cacao, slavery, and coerced labor unfortunately does not end in Brazil. The South American country's independence from Portugal in 1822 struck a blow against the profitable colonial trade in cacao that the Crown had relied on for more than a century and a half. The Portuguese government struck back. In 1824, it transplanted cacao cuttings from Bahia to two small Portuguese-held islands off the coast of West Africa, São Tomé and Príncipe. It also transplanted the cruel Brazilian system of mostly slave-based plantation production. On these small islands private cacao growers from Portugal benefited from government monopolies and tax breaks to establish *roças* (plantations) that by the 1880s pushed out sugar and coffee farms for a carpet of cacao trees. For the next three-quarters of a century, slaves and coerced laborers harvested and processed cacao. The slaves came from Portuguese colonies on the mainland, primarily Angola and Mozambique, the two countries that also supplied slaves to Brazil (Richard 2019).

But European and U.S. abolitionist movements began to push a shift in public opinion. By the 1870s, slavery was generally regarded as a moral travesty. In the Portuguese colonies, it was formally abolished in 1869. The plantations responded to revolts of São Tomé's newly freed slaves by establishing labor codes that promised freedom. In reality, they perpetuated effective slavery through a system of contracted workers (Macedo 2016). Africans from the mainland were coerced or misled into signing contracts requiring them to work in island cacao for a number of years, after which they were supposedly free to return home. In fact, the workers were bullied into renewing contracts, meaning most never returned to the

mainland. Work centered around highly regimented *roças* run on military principles. Children born to the *roça* workers also were required to sign contracts on becoming adults. Between 1875 and 1904, 67,000 African men and women sailed to the tiny archipelago, many of them desperate to escape violence and enslavement on the mainland but finding things were no better on the islands.

The fact that mainland African chieftains continued to enslave and brutalize natives worked to the benefit of the São Tomé and Príncipe plantation owners. They could argue that in bringing Africans to the estates they were providing safety and a civilizing influence, a reflection of the intrinsically racist “White Man’s Burden” principle popular at the turn of the last century. The regimented plantations and their work in cacao could be a civilizing influence, it was argued. Forced labor and violence to control African workers undercut the plantation owners’ high-minded declarations in what the world would soon call the Chocolate Islands.

Wary antislavery chocolate producers in Europe were at first fooled by the owners’ efforts to operate plantations under the most modern and advanced principles of the day. Established in 1870, the large Boa Entrada estate offered the world an example of esteemed scientific efficiency to improve cacao growing and processing, and experiments to adjust fermentation for a less bitter cocoa. Yet rumors that the Portuguese contract-worker system was in effect slavery persisted into the twentieth century. In 1903, Portugal tried to reign in the system to please British critics who showed most concern, but the critics said it was merely a pretense that changed little (Higgs 2012). William Cadbury, owner of one of the world’s largest chocolate companies based in Britain, imported more than half his cocoa from São Tomé and Príncipe. His concern grew that the Chocolate Island cacao plantations were in effect slave operations. He was unable to get away for a site visit, so he sent Joseph Burt to investigate.

The early twentieth century ushered in a profusion of crusading journalism. Famous “muckrakers” uncovered abuses of government, industry, and food manufacturing that encouraged reform; in Britain, journalists such as E. D. Morel investigated colonial oppression in the Belgian Congo. It was Morel who first signaled to Cadbury that virtual slavery probably extended to the Chocolate Islands, fast on their way to becoming the world’s largest exporter of cocoa by 1913. Before Burt could issue a report, however, British journalist Henry W. Nevinson in 1904–1905 began a series of exposés in *Harper’s Monthly* revealing the slave trade between Angola and the Chocolate Islands. Nevinson himself walked the same centuries-old slave trail (250 mi., 400 km) from interior Angola to the coast to document a system of violence and threats that gathered 270 destitute Angolans every two weeks into ships bound for the “islands of doom” (John 2002; Jowell and Cabral 2015). He estimated annual import of about four thousand slaves. The series was reprinted in the 1906 book *A Modern Slavery*. Nevinson was dismayed, however, when none of the big chocolate companies responded to his call to boycott Portuguese cocoa from the islands.

Burt knew Nevinson and his work, but Cadbury preferred to send his own investigator, rejecting Nevinson’s offer of assistance. Burt spent June 1905 to March 1907 on the islands, and then visited Angola. Despite separate investigations, Burt uncovered evidence similar to that of Nevinson. He found most

workers from Angola could not leave and were in effect slaves, with a situation in Angola even more brutal. Some of the “contract” workers were paid a tiny amount, \$2.50 a month for men, and the death rate was as high as 20 percent. His report to Cadbury accused the Portuguese government of perpetuating slavery. Cadbury, a Quaker, shared the report with the other two large British cocoa firms also owned by Quakers, Rowntree and Fry. He argued the system was contrary to Quaker human rights principles (Higgs 2012).

Lisbon was already enraged at Nevinson’s accusations. When Burt’s report was published in July 1907, Cadbury demanded that the Portuguese reform its abuses. After visiting himself in 1908, Cadbury became fed up with Portuguese evasiveness and in 1909 declared he would boycott cocoa from São Tomé and Príncipe. Fry, Rowntree, and German confectioner Stollwerck joined him. In the United States, the largest cocoa manufacturer at the time, Walter Baker, had already quit buying Portuguese chocolate, but other manufacturers declined to join the boycott. Portuguese authorities in consternation responded that cacao workers were treated better than they had been at home, and that workers were allowed to leave after contracts expired. Cadbury found Portuguese arguments unconvincing and continued the boycott.

Assassination of Portuguese king Carlos I in 1908 subsumed the country in political upheaval that ended a thousand-year-old monarchy, fomented a military coup, and paved the way for a dictatorship. Promises to reform the system did effectively end slavery in Angola, with reforms as well on the plantations. But reformers’ attention turned after August 1914 to World War I. Monitors for reform dwindled. But so did cacao exports from São Tomé and Príncipe. Disease hit the islands with a force far greater than boycotts: exports plummeted after the war. Cacao production had already moved to the African continent; by the interwar period, the former Chocolate Islands would fall into obscurity, and the great plantations into ruin. But accusations of virtual slave labor perpetrated there never did end.

After the islands’ independence in 1975, a few entrepreneurs considered trying to restore cacao to the former Chocolate Islands. By 2020, featuring fine cocoa for connoisseurs, they profited from burgeoning world interest in fine-quality chocolate.

The record of Walter Baker chocolate in the United States in avoiding association with slave labor would perhaps encourage one to presume the nation was a bright spot in a dark cocoa story. But that is more a wish than a fact. While the American colonies were nearly all too far north to grow their own cacao trees, they did employ slaves to process beans and produce the beverage. Wealthy American colonists often relied on slaves for the tedious process of roasting and shelling the beans and grinding the nibs. Colonial newspaper advertisements for runaway slaves sometimes described the slave as a “good chocolate grinder” (Grivetti and Shapiro 2009). And while Baker’s chocolate eliminated slave-produced São Tomé cocoa from its imports by the 1840s, it did continue to import some cocoa from Brazil.

One can hope that a move from the islands to the African mainland would encourage better conditions for workers of cacao. The Gold Coast, by 1900 a British colony that became modern Ghana, saw the beginning of cacao production at the end of the 1800s. Cadbury moved its sourcing there after the boycott. Also becoming important cacao-producing nations in the early twentieth century were

Ivory Coast, Nigeria, Guinea, Sierra Leone, and Cameroon—the last operation established on the *roça* system when still a German colony. Despite the hope, all operations at the beginning relied on slaves or coerced workers (Walker 2007). Most, however, did not import the Portuguese plantation system. Instead, Ghana in particular grew in importance based on low investment in labor and capital to encourage a patchwork of smallholders, each producing a modest amount of beans. This less formal system usually produced lower quality cocoa, but by then in popularity milk chocolate had all but replaced dark chocolate. Cadbury and other large manufacturers could rely on a lower quality bean because milk chocolate required less cocoa mass, sometimes as little as 10 percent. West African chocolate helped to revolutionize the cocoa sector in favor of quantity over quality, driving a huge mass-production industry that generally featured sugar-laden, milk-based products containing smaller amounts of chocolate. By 1930, smallholders in Ghana, Ivory Coast, Nigeria, and Cameroon supplied the world with 65 percent of its cocoa (Winton 2017). South American and Caribbean cocoa that had dominated the trade from 1500 to 1880 was tumbling to the point where producers there today cater mostly to the small fine-chocolate movement (2 percent of world production). Most mass-produced chocolate's origin today is not labeled, but we can presume it came from either Ivory Coast or Ghana. While its reputation for quality was originally low, improving standards of fermentation along with careful processing has brought much of what we call “bulk” chocolate to a quality that is reasonable, even good. Cocoa elitism today is no longer a good reason to avoid West African-sourced chocolate.

There might be another reason, however. The ghost of slavery and coerced labor that has dogged the industry from its ancient origins by 2020 still had not been banished. As the cocoa sector in the last century grew to domination by a handful of big multinationals, demand for inexpensive chocolate also increased exponentially. Production of bulk chocolate has expanded to Indonesia and other countries, but today still about 70 percent of world production flows from just two countries. Ivory Coast is number one, with about 50 percent (1.9 million metric tons in 2016–2017); Ghana at number two produces about 20 percent (Shabandeh 2020). A global industry of giant producers relies on smallholding African farmers who have carved plots out of the rainforest, 10 acres (4 ha) of cacao trees or less. “If you want to buy fine cloth, it is cocoa,” goes a traditional song of Ghana. “If you want a meaningful life, it is cocoa” (Pilling 2019). Two million cocoa farmers in West Africa seem to have taken that song to heart. But few have found wealth.

Their relatively tiny smallholdings narrowly cover sustenance when the world price for cocoa is high; when it drops, as it has generally for the last two decades, many of these farmers hardly scrape by. Selling perhaps a few 140-pound (63-kilo) sacks a year, in 2019 they would have earned \$400. The cocoa sector is a \$100 billion industry, in 2019 observed Nana Akufo-Addo, president of Ghana, of which the farmers who supply the beans bring in about \$6 (Pilling 2019).

As profit is so elusive, temptation to rely on a twenty-first-century version of coerced labor has sometimes overwhelmed West African cacao farmers who desperately need to cut corners for a way out of poverty. They have relied on child

labor. In 2000, an international scandal broke after a BBC broadcast revealed that human traffickers from Mali and Nigeria bused hundreds of children to the Ivory Coast to serve cacao farmers. The children, working in dangerous and violent conditions, could not return home and were paid sometimes nothing. Effectively they were child slaves (Lawrance and Roberts 2019; Schrage and Ewing 2005). The world's largest multinational cocoa concerns were accused of ignoring reports of child forced labor. Worldwide economic deregulation encouraged cocoa industry consolidation, and a cocoa price fall hit hardest those at the bottom of the chain—farmers.

Ensuing U.S. State Department investigations uncovered evidence of child labor throughout the West African cacao industry, prompting calls in Congress to require manufacturers to indicate on labels whether child slaves had been used in its products. Major cocoa multinationals, protesting regulation, signed the Harkin-Engel protocol in 2001 promising to root out child labor. In 2010, the Chocolate Manufacturers Association renewed a promise to eliminate child labor in the industry. The industries' International Cocoa Initiative was charged with eradicating child labor. But by 2011, it had not been able to do so. A new industry goal to eradicate child labor in the cocoa sector by 2020 was not expected to be met. The World Cocoa Foundation representing large multinationals did contend progress was being made, including funding for schools and better production methods (Whoriskey and Siegel 2019).

While some critics have accused large cocoa multinationals of negligence in their failure to remove children from the growing and gathering of cacao, in 2020 evidence showed that the industry had limited ability to respond on their own. West African governments were asked to take steps, and while Ghana and Ivory Coast law forbade child labor, political instability particularly in Ivory Coast made laws difficult to enforce. Schools and teachers were not available to many of the children. Tracing the source of cacao to child labor among the maze of some two million smallholders eking out livings in the rainforest proved nearly impossible for large buyers. Farmers themselves often employed their own children to work, and when they took on children from other countries, they said they had no choice as they could not afford to hire adults. "I admit that it is a kind of slavery," said one farmer who did not want his name used to a *Washington Post* reporter in 2019 (Whoriskey and Siegel 2019). Children trafficked from destitute countries such as Burkina Faso told investigators their families desperate for survival presented them to child labor traffickers in hope that they would be able to send some of the small amount of money they made working cacao back to their parents. But too often the children, as young as ten, ended up not in cacao production but in prostitution or in desperate straits themselves.

The underlying problem, agreed many industry and government leaders, was the insufficient amount of money smallholders could make producing cacao. Farms were too small, and increased production simply encouraged lower cacao prices. Certification programs such as Fairtrade and Rainforest Alliance/UTZ have worked to increase amounts paid to farmers, but critics said they were too bureaucratic and not efficient enough to make a difference. In 2019, Nicko Debenham, head of sustainability for cocoa-processing giant Barry Callebaut, said his

company was trying to persuade farmers to diversify into vegetables, soap-making, honey or livestock, pointing out that the millions of tiny cacao operations needed to grow to be profitable (Pilling 2019).

A few bean-to-bar craft chocolate producers have taken the initiative themselves by establishing relationships with cacao farmers, called direct trade. These small producers try to improve on the fair-trade model by paying more than the typical 10 percent over market price. Teun van der Keuken, the Dutch proprietor of Tony's Chocolonely, declared that the brand was committed to a slave-free chocolate industry. He reported that he worked with farm co-ops and established a process to trace cocoa supply chains. Taza Chocolate in Massachusetts published a yearly direct-trade report detailing the source of its cocoa and relationships with its farmers. Another small but prominent direct-trade producer, Shawn Askinosie of Missouri, explained in 2020 that the "farm gate price," what actual farmers receive for the cocoa, was most significant. According to Askinosie Chocolate reports, the company paid farmers an average 35 percent above world market prices and 25 percent above fair trade price, plus profit sharing. But bean-to-bar and craft manufacturers who have fueled the craft chocolate movement are small, often micro-producers, comprising 2 to 6 percent of the cocoa industry (Chainpoint n.d.; Askinosie Chocolate n.d.; Taza Chocolate 2020; Ott 2014).

Unfortunately, by 2020 child labor and trafficking still had not been eliminated from the cacao supply chain. A U.S. Department of Labor study in 2015 showed 2.12 million child laborers worked in cacao production the year before (Brannon 2015). It may have increased due to lockdown pressures of the 2020 pandemic that kept children out of school (*The Chocolate Life* 2021). A 2019 report by the industry-sponsored International Cocoa Initiative did detail some evidence of progress, with more children attending school and fewer exposed to the hazards of cacao production. Nevertheless, when asked in 2019, no multinational chocolate company could guarantee their products were not produced with child labor. The consequences of historic income and racial inequalities between cocoa-producing and cocoa-consuming peoples continue to bedevil production of the world's favorite treat.

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The Spirit of Chocolate

Myth and Religion

Karl Bakkum

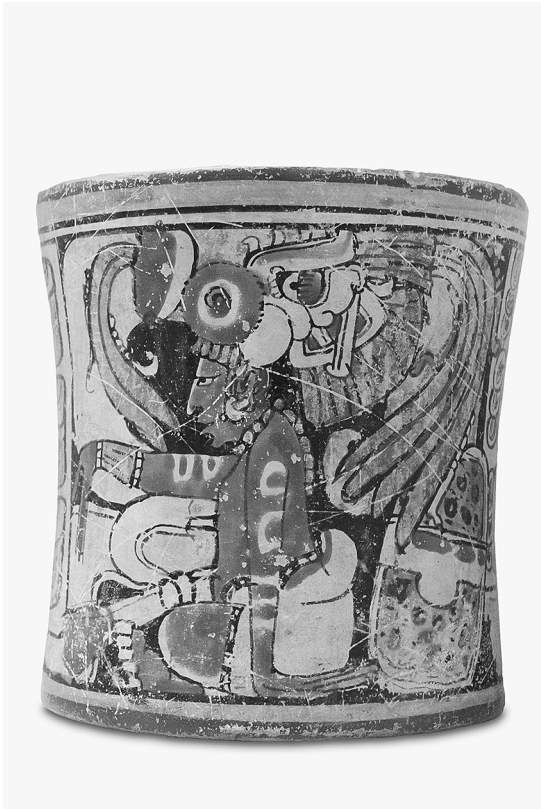
Mythical properties, pre-Hispanic Maya rituals, mysterious cenotes, ancient glyphs, modern-day wedding customs, Jesuits, Jews, Quakers, Dominicans, and Spanish missionaries. What do all the items in this list have in common? Chocolate (or the cocoa bean in its various forms and uses) is the common element that links them all. The history of *Theobroma cacao*, the “food of the gods,” is intertwined with myth, mystery, and religion, ancient and modern.

For much of its history, chocolate was a beverage for the elite, whether Maya rulers, Aztec lords like Montezuma, the kings and queens of Europe’s royal courts, or the ecclesiastical upper class of the Catholic Church. From its genesis in ancient Mesoamerican culture through its introduction to Europe a hundred years or so after the Spanish conquest of 1521, chocolate wove its way through the human story, played an important role in ancient ritual, and is still used in some cultures to celebrate religious milestones, such as weddings. It was not until modern times when it became possible during the Industrial Revolution to inexpensively mass produce chocolate to make it available to the masses that chocolate became a common and wildly popular food.

Before they became renowned for their culinary appeal, however, cocoa beans were a common unit of money in Mesoamerica for hundreds if not thousands of years. The mild stimulant properties of chocolate have made it the subject of contradictory claims at various times and in various places throughout the centuries: that it is a beneficial food (or a harmful substance), that it imparts aphrodisiac properties to those who imbibe (or not), that its use should be precluded during times of fasting for Catholic Christians (or, on the contrary, that since it was only taken as a liquid, it should be considered a beverage that did not break the fast). The distribution and marketing of cacao over the centuries by people connected to various faith traditions, including Catholics, Quakers, and Jews, has also been the

subject of ethical disputes, given the history of the use of slave labor in cacao farming and production, and considering the competing interests of some of the purveyors of this magic bean. The complicated history of chocolate in myth and religion is as deep as the deepest dark chocolate bar you have ever tasted, a complex story as intricate as the nuanced tastes of the many types of chocolate and added flavors that may be found on the confectioner's shelf today.

Historians have traced chocolate in both myth and practice over several millennia of Mesoamerican culture. The pre-Olmec, Olmec, Maya, and Aztec cultures cover the continuous geographic regions that today consist of portions of Mexico, Belize, Guatemala, Honduras, El Salvador, Nicaragua, and Costa Rica. These shared a common culture (Dreiss and Greenhill 2008; Coe and Coe 1996). For many years, scholars considered the Maya as the originators of chocolate; however, recent discoveries have detected the chemical residue of chocolate in neckless jars that are radiocarbon dated back to the Olmec culture, early in the second millennium BC.



Cacao was central to the Maya culture of Mesoamerica beginning as early as 600 BC. Drinking vessels, such as this Guatemalan cup dating to AD 600, portray cocoa rituals that help archeologists understand the role of chocolate in ancient American cultures. (Whpics/Dreamstime.com)

Chocolate was used not only as preferred drink of kings and ritually in games but also was considered a drink of the gods that was therefore offered in ceremonies and sacrifices. The cacao tree is depicted in stone carvings as a means for humans to communicate with the gods. And the tree is said to have been present at the creation of the world, playing a role possibly as important as corn (maize), which, with water, is said to have been the substance that created humans. In pre-Columbian and Mesoamerican books or “codices,” cacao is often shown in glyphs and drawings at the entrance to caves and cenotes, which were extensively used by Mesoamericans as ritual entries to the underworld (Dreiss and Greenhill 2008; Anderson, Berdan, and Lockhart 1976). Based on interpretations of Maya glyphs found in hieroglyphic texts and painted on ceramics and capstones of buildings in the Yucatan and elsewhere, researchers draw educated conclusions on

the ritual use of cacao among the pre-Hispanic Maya, and trace the origins of the role of cacao back into the mists of time before memory and recorded history.

Chocolate as liquid, in appearance quite similar to human blood, was also part of rituals of sacrifice played out to appease Maya deities, who were thought to be in charge of everything from the movements of the sun, moon, and stars, to the seasons, the wind and rain, and other aspects of daily life. Chocolate pods are associated in stone carvings and other surviving murals and texts with cacao-related gods and goddesses, depictions of ritual games, and even with the extraction of the human heart from sacrificial victims. Traces of chocolate (or of the chemical compound found in chocolate) have been found in vessels carbon dated to between 1500 and 1800 BC, putting the earliest consumption of chocolate back into Mesoamerica's prehistory (Frydenborg 2015). Evidence of the chemical remains of cacao, confirmed in Hershey labs in 1990, indicated that cacao was used to make an assortment of drinks and gruels. These were served in a variety of containers commonly used during Later Classic Maya culture. One such vessel, originating in a tomb at Rio Azul, Guatemala, was dated between AD 500 and 800, and was decorated with the glyphs for cacao. Earlier use, as early as AD 400 to 600, has also been confirmed in vessels found in Belize (Grivetti and Shapiro 2009), and as mentioned previously, recent discoveries have placed the use of chocolate in the Olmec culture much earlier.

There is little doubt that cacao has been an important element of Mesoamerican culture, economy, and religion for millennia. Cacao pods commonly decorate Maya and pre-Maya art, and cacao is referred to in priestly writings, sacred texts, and official records. From the cradle to the grave, cacao was present in Maya life. Catholic clerics were surprised to witness a Maya baptismal rite in which cocoa beans, ground with flowers and mixed with pure water, was used to anoint boys and girls between three and twelve years of age. Records show that chocolate was enjoyed mostly as a drink that was stirred or poured out from a height to form a foamy top. Ground cocoa beans were mixed with cornmeal and shaped into bars, a foretaste of today's chocolate bars. Cocoa beans and serving accessories are commonly found in Maya tombs, presumably providing sustenance to the dead on their journey into the afterlife (Frydenborg 2015).

In several geographical regions, the *Theobroma cacao* tree plays a significant role in the culture's creation story. It is often equated with the "tree of life," present during the creation of the world and prior to the creation of humankind. Evidence for this can be found in a writing known as the *Popol Vuh*, which depicts cacao as one of the substances emitted from "Sustenance Mountain," which also included maize, creating the substance out of which humans are formed. Before this, these essential life forces had been hidden in the Underworld, for use only by gods. Vail noted that the *Popol Vuh* is a sixteenth-century alphabetic text from the highland kingdom of the Kekchi Maya. The *Popol Vuh* refers to its own origin in previous written texts and in oral tradition that date back as early as the second century BC (Grivetti and Shapiro 2009).

While chocolate certainly played an important role in the economy, myth, and religion in pre-Columbian Mesoamerica, perhaps its true power is revealed in its

use as currency, as a medium of exchange over centuries. “The lure of this highly prized commodity catalyzed an extensive trade industry throughout Mesoamerica, creating a powerful merchant class with patron gods and provoking fourteenth-century Aztec domination of the cacao-growing regions in Mexico and Central America” (Dreiss and Greenhill 2008, 5). In pre-Hispanic Mesoamerica, cacao cultivation, harvest, and processing are sure to have employed many. As a medium of exchange, cacao beans were a simple way to store wealth, until such time as they could be exchanged for goods and services, or paid in tribute to those in power. Chocolate’s significance as money notwithstanding, the taste of chocolate was the allure that ancients and moderns alike enjoyed, and as a commodity, chocolate is rich in value and attraction.

When Hernán Cortés’s armies first defeated Montezuma’s armies in 1521 at the Aztec capitol of Tenochtitlán on the present-day site of Mexico City, great changes would soon overtake Mesoamerican culture. Established laws, cultural mores, political relationships, and public and private behavior and practices would undergo massive transitions. Not the least of the changes, the cultivation and use of the cacao bean became one of the many ways that European and Mesoamerican cultures blended. The significance of the cacao bean as money was not lost on Cortés, but it would be several decades before the importance of this magic bean would become fully known to the European colonialists. The ritual use of cacao both in celebration and sacrifice would continue in Maya culture, but the Christianization of the native people soon changed this symbol from the drink of gods into a more pedestrian commodity. It would eventually be blended with cane sugar to become a sought-after drink and confection throughout the Catholic Church’s sphere of influence, and beyond.

Columbus and explorers/conquerors who came after him acted not only under the decree of kings and queens but also often carried the blessing of the Catholic Church. Its message they would spread throughout the world through conversion of native peoples. Franciscan monks were the first to arrive in New Spain in 1523 and 1524, sent by Carlos V at Cortés’s request. Dominicans followed a year later in 1525, and Augustinians in 1533. Jesuit friars, the order having been founded by Ignatius of Loyola in 1534, came later in 1571. By then many hundreds of Catholic priests and brothers in New Spain often found themselves in the front lines of the church’s work in the New World (Palfrey 1998).

The Jesuits’ strategy of “inculturation as part of their New World evangelization” (Jesuits in Britain 2017) was one way that Catholic monks adapted to local customs and dress. Drinking chocolate was certainly one of the customs they adapted and began spreading among their order, then among all Catholic clergy, and eventually in royal courts and finally in society at large. While the Jesuits’ reputation for exploiting native populations is well deserved, missionaries would also come to the aid of Indians when it suited their purposes. For example, when Portuguese and mestizo slave-hunter raiders were rounding up Brazilian Indians to export as slaves, “to their credit, the Jesuits were the first to protest this vile injustice” (Coe and Coe 1996, 194).

On his fourth journey to the New World arriving August 15, 1502, Columbus and his men encountered two large sea-going vessels, great Maya trading canoes.

These were laden with goods and traveling Maya merchants, rowed by slaves roped together at the neck. Moored at the island of Guanaja in what is known today as the Bay Islands near Honduras, the European party seized the contents of one of the canoes and abducted several of the canoe's inhabitants, in typical colonial fashion, considering themselves entitled to the spoils of their conquest. Columbus's son Ferdinand, along on the journey, provides this account:

For their provisions they had such roots and grains as are eaten in Hispaniola [these would have been maize and manioc], and a sort of wine made of maize which resembled English beer; and many of those almonds which in New Spain are used for money. They seemed to hold these almonds at a great price; for when they were brought on board ship together with their goods, I observed that when any of these almonds fell, they all stooped to pick it up, as if an eye had fallen. (Quoted in Coe and Coe 1996, 107)

The “almonds,” of course, were cacao beans that the Maya used as money and paid as tribute to Aztec overlords. In his official chronicle of the New World, historian Peter Martyr d'Anghera (1457–1526) provided an early indication of reports that reached the Vatican, and presumably the royal court, of the importance of the cacao bean, the “money that grows on trees”: “Blessed money which furnishes mankind with a sweet and nutritious beverage and protects its innocent possessors from the infernal disease of avarice, since it cannot be long hoarded nor hidden underground. . . . For this groweth upon trees . . . drinke is made from of them for rich and noble men” (Martyr d'Anghera, quoted in Prinz 2017, 129). Peter Martyr d'Anghera's eyewitness accounts described the use of chocolate as one of the luxuries of Montezuma's court, writing that chocolate was “as wine, a wonderful drink, fitte for a king” (quoted in Norton, *Sacred Gifts*, 54, in Prinz, 2017, 129).

Dreiss and Greenhill, referencing a 1996 paper by Janine Gasco, point out that as a medium of exchange, cacao beans were “portable, divisible, not easily counterfeited, and recognizable as a symbol for wealth” (Gasco 1996, 101). Spanish invaders soon learned the relative value of these “almonds” and their typical purchasing power. According to accounts from the colonial era, the wages of a laborer, such as a porter, might be set at one hundred beans per day. Accordingly, Coe and Coe cite some commodity prices from a list in Tlaxcala, in a Nahuatl document from 1545: a small rabbit was worth about thirty cacao beans, but a large hare or jackrabbit could garner as much as one hundred beans. One could purchase a turkey egg for three cacao beans or a tamale for a single bean, and a fish wrapped in maize husks cost three beans (Anderson, Berdan, and Lockhart 1976, 98–99). Clearly cacao beans were commonly accepted as means of exchange. At these rates, expending a hundred or more beans to mix a pot of liquid cacao to drink was a privilege reserved for the wealthy.

Compared to the gold, silver, and other astonishing treasures that Columbus and Cortés introduced to the Spanish court, however, the lowly cacao bean was barely noticed. It took several decades before the writings of Dominicans and others began to reveal this bean's powers. In 1544, a Kekchi Maya delegation introduced by Dominicans prepared chocolate for members of the Spanish court. This rich, foamy delight must have both intrigued and pleased members of the court,

but several more decades would elapse before Spain would try to establish a monopoly over the growing chocolate trade (Prinz 2017).

By the 1630s, Spaniards were drinking sweet chocolate in New World chocolate-eries, according to an account by English Dominican friar Thomas Gage (1597–1656) (Coe and Coe 1996; Prinz 2017). Gage also hinted at some of the controversy surrounding the clash of two cultures when he referred to a dispute between women who were drinking chocolate during the Mass. The bishop in Chiapas, who forbade that practice, threatened to excommunicate those who would not comply. Rather than capitulate, the offending parishioners simply moved to another parish. The bishop would mysteriously die from allegedly drinking poisoned chocolate a short time later. This dispute and others regarding the use of chocolate by Catholic Christians were to become the subject of some contention.

One of those controversies developed around the use of chocolate during Lent and during or before Mass. Was it or was it not breaking the Lenten fast, or the fast before partaking of holy communion during Mass, to imbibe in chocolate drink? Two camps emerged, with the Dominican monks (whose ubiquitous presence in “New Spain” acquainted them early with the pleasures of consuming chocolate) arguing that drinking chocolate before Mass and during Lent was breaking the fast. Jesuits, who were known to have been involved in the importation and sales of chocolate, and hence had a financial interest in the theological question, asserted that since it was not a solid food, drinking chocolate did not break the fast. Furthermore, it provided much needed liquid and nourishment during fasting to prevent fainting and drowsiness.

The disagreement raged for more than a century. In 1569, Pope Pius the V was given a cup of chocolate to drink and found it distasteful and bitter. He declared that such a drink did not break the fast. Unfortunately, the discussion lingered until nearly a century later, when Pope Alexander VII in 1662 sided with the Jesuits when he declared that “Liquidum non frangit jejunum” [Liquids do not break the fast]. This declaration and a decree issued by the Holy Office in 1666 settled once and for all the question of whether or not consuming liquid chocolate breaks the fast (Jesuits in Britain 2017).

Other associations with chocolate as an aphrodisiac, a stimulant, or as an element used in the dark arts also concerned the church. In Mesoamerican culture, chocolate had been identified as enhancing the sexual experience, and it was not uncommon for chocolate to be exchanged along with wedding vows by married couples. In fact, this custom persists today in certain parts of Mesoamerica (Dreiss and Greenhill 2008). Bernal Diaz del Castillo in *The Discovery and Conquest of Mexico* (1520) stated it thus:

From time to time the men of Montezuma’s guard brought him, in cups of pure gold, a drink made from the cacao-plant, which they said he took before visiting his wives. I saw them bring in a good fifty large jugs of chocolate, all frothed up, of which he would drink a little. (Quoted in Frydenborg 2015, 24)

The sixteenth-century church was suspicious of such associations with chocolate and is reported to have prosecuted women who used chocolate in spells to bewitch their husbands, to seduce lovers, or to mix with poison for their enemies. In an

incident that could have been a precursor to modern-day sex scandals in the Catholic Church, a

twenty-eight-year-old *mulata* slave of a nun, Rosa de Arrevillaga, served a priest (Padre Francisco de Castellanos) chocolate at confession during Easter in front of the other priests, as was customary. However, when she entered the confessional, he started to seduce her. She fended him off, and he accused her of “bewitching his chocolate with powders to gain his love.” (Norton 2006, 679–680)

This “the devil made me do it” type of rationalization that blames adulterated chocolate for the sins of a clergyman sounds all too familiar. The role of secular and religious clergy in New Spain, however, was complicated. The pope had granted the Spanish Crown authority over the church in Spain, therefore clergy acting under the control of their bishops, presumably appointed by the Crown, were deemed to be operating with secular authority. Missionaries, however, had self-governing authority, based on a decree of Pope Leon X in 1521. Secular priests were not permitted to interfere in the affairs of missionary clergy, so Jesuits, for example, were considered religious clergy, and they could exert considerable influence among the common people with little accountability. The Jesuits learned that using cheap or free native labor they could reap immense profits from cacao enterprises. On the other hand, missionary clergy are sometimes credited with shielding the native population from slave hunters, excesses common among Spanish civilians and soldiers, or protecting native peoples from discrimination and persecution by advocating for enforcement of laws that forbid such discrimination (Palfrey 1998).

Coe and Coe cited the development of the Jesuit commercial cacao operations in Paraguay that the Jesuits also likely employed in Brazil and Bolivia. Society of Jesus managers organized the native population into *aldeas*, small villages that could be tightly controlled and isolated from the outside world. Natives who were formerly fisherman, hunters, or farmers would now take their orders from the Jesuits, gathering cacao from wild stands that grew in abundance, and whose fruit containing the raw cacao beans could be harvested several times a year. The free or extremely cheap labor, combined with the duty-free status that religious orders were afforded when shipping cocoa, added up to a very lucrative business model. This attracted the attention of some of the Jesuits’ enemies who were also influential politicians and businesspeople attempting to exploit the profits of the New World. Beginning in 1759, Pope Clement XIV began banning the Society of Jesus across Europe, and eventually the movement was forced to go underground. Jesuits were expelled from Portugal and Brazil at the behest of Portuguese Marquis Sebastião de Pombal (1699–1782), and several years later Charles III of Spain banned Jesuits from Spain and its colonies, including Paraguay, in 1767. While their adventures into New World chocolate had been quite lucrative for a time, the Jesuits themselves fell on hard times, nearly disappearing from existence, until the ban was finally lifted by Pope Pius VII in 1814.

Other religious orders were known to exploit the chocolate trade, sometimes for their own survival in difficult circumstances. During the most difficult of the Napoleonic years (1798–1814), the future Pope Gregory XVI (r. 1831–1846), then known as Mauro Cappillari, was instrumental in helping his Camaldolese order to

produce and distribute chocolate among their confreres and in retail trade throughout Italy (Korten 2017). The French Revolution was disastrous for many French Catholic organizations, including abbeys and monastic orders, as the government seized control of their property and assets, eventually banning worship and dissolving monasteries, churches, and abbeys. When Napoleon came to power in 1799, he negotiated a settlement with Rome regarding the role of the Catholic Church in the lives of French citizens. After that agreement soured, Napoleon conquered Rome in 1808. Pope Pius VII excommunicated him in response. Napoleon promptly retaliated by having the pope arrested and jailed. Against this chaotic background, religious orders were left mostly to fend for themselves, hence the necessity to find means of producing income.

Because Cappellari was to eventually become pope (Gregory XVI) in 1839, records of his earlier commercial activities were well documented. It is clear that Carmelite monks used their commercial connections to import and manufacture chocolate and to sell it to an eager marketplace during the lean decades of the Napoleonic years. This earned sufficient income to help keep the order afloat and helped develop a reputation for quality chocolate that would survive into the post-Napoleonic years (Korten 2017).

While we are examining the intersection of religious tradition and chocolate, we must not neglect the role of Jewish merchants in promoting its trade, particularly as it became a means to survive numerous persecutions, banishments, and inquisitions. When and why did the Jews become involved in the chocolate business? Cecelia Shapiro offered a lesson in the history of Jewish oppression when trying to trace the origins of Jews and chocolate (Grivetti and Shapiro 2009). From the time of the Crusades, during which crusaders terrorized non-Christians, to the Inquisition, which in Rome condemned the Torah in 1242, to the first mass burning at the stake of Jews in France in 1288, Jews had ample reason and motivation to deal in a commodity that they could trade internationally as a means of surviving in a hostile environment. The story may have begun or picked up traction as the Spanish Inquisition in 1391 perpetrated the mass slaughter of 90,000 Jews in Spanish cities, or when the great expulsion of Jews from Spain (and later Portugal) decreed by Isabella and Ferdinand in 1480 caused many Jews to flee the country. Some of them were bound for the New World, including several Jews documented to have been on board for Columbus's first journey westward (Grisar 2019).

In 1654, Benjamin D'Acosta de Andrade arrived in Martinique and established what is thought to be the first cocoa-producing plant in the New World. Using techniques learned from Mexicans, D'Acosta de Andrade began manufacturing chocolate, leveraging the use of two sugar refineries he also owned. This entrepreneurship apparently provoked the ire of Jesuits, who resented the competition (Grivetti and Shapiro 2009). Whenever the origin, and whatever the motivation, Jews embraced the growing desire and market for chocolate originating in the Americas and bound for European markets.

Men like D'Acosta de Andrade used their international business and family connections to establish transatlantic trade in cacao and other commodities. Another D'Acosta, Joseph, was a large shareholder in the Dutch West India Company, which soon established trade routes shipping cacao to Amsterdam from

Venezuela and Curaçao. Joseph D'Acosta had relocated from Holland to New Amsterdam, and several years after his arrival, the cocoa trade between the West Indies and New Amsterdam and the trade route from the West Indies to Europe grew substantially. This chocolate product would make its way to England and throughout Europe (Shapiro 2009).

Rabbi Deborah R. Prinz picked up the thread of Jewish adventures in chocolate, citing numerous records of the Inquisition in which Jewish conversos (Jews who had outwardly agreed to convert to Christianity) were engaged in chocolate trade. In spite of their contributions to the economy, these Jewish merchants were continually tormented by Inquisition officials. A typical example is the merchant Manuel Alvarez de Arellano, who imported goods from Seville and distributed them throughout New Spain in 1641. On the return trip, he was carrying Mexican chocolate and other items back to Spain, but he was arrested by Inquisition officials in 1642. He was sent back to Mexico for trial (Prinz 2017). Punishment for a Portuguese cacao retail merchant Luis Nunez Perez, who was arrested shortly after arriving in New Spain, was severe. His sentence was reconciliation with the Catholic Church and life in prison. Tormented, harassed, banned, persecuted, tortured, executed, or forced to convert to Christianity, the Jews nevertheless established networks in the Old and New Worlds that enabled them to successfully trade in chocolate and other commodities.

The Quaker Movement (The Religious Society of Friends) was founded by George Fox in England in 1652. Because they were nonconformists and their movement was founded in part as a reaction against the established church, Quakers were not readily accepted in British society. Their beliefs also led them in the direction of pacifism and social reform. Fox was imprisoned for six months for his preaching and subsequently jailed again when he refused to join Cromwell's army. Since the British government excluded Quakers from university education (only practicing Anglicans were permitted to enroll) and closed doors to them in other professions, including medicine and law, they gravitated toward businesses in which they could become successful, all the while pursuing their utopian ideals (Prinz 2017). One such business was the trading and retail sale of chocolate. Since it was mainly consumed as a liquid, the teetotaling Quakers possibly saw chocolate as an alternative to alcohol, which they perceived as a bane in society. Because of their emphasis on hard work and ethical business dealings, Quakers became successful in the growing chocolate trade.

Quaker Joseph Fry established his apothecary shop in Bristol in 1759. Chocolate was by then commonly used to disguise the bitter taste of some medicines, and as a result, Fry was already familiar with some of the benefits of chocolate. When manufacturing equipment became available, the Fry firm began selling "eating chocolate" in 1847, the first, and soon to be the largest, manufacturer of bar chocolate in the world. As a supplier of chocolate to the Royal Navy, Fry's contract insured a steady market. Although Quaker adherents did not celebrate Easter, Fry was likely the first chocolate maker to offer a chocolate Easter egg in 1873. Fry's was later purchased by Cadbury, another British Quaker-owned chocolate company, in 1919, and perhaps that is why Cadbury is often credited with the development of the chocolate egg (Prinz 2017).

Cadbury's Coffee and Tea Shop had opened in 1824 in Birmingham. John Cadbury soon branched out into serving liquid chocolate drinks as this beverage was becoming more and more popular. Because the water to make a chocolate drink had to be boiled, it was a safer alternative to drinking water from the tap, which was suspect at best. As noted, chocolate was also considered a healthier substitute for alcohol. By 1860, Cadbury's sons George and Richard purchased a Dutch-made chocolate press that enabled them to start separating cocoa butter from cocoa solids.

The Cadburys became rich, and faithful to their Quaker ideals, they established the town of Bournville near Birmingham, constructing a factory outside of the city to improve the living conditions of their workers. The workers benefited from a pension plan and leisure and health care facilities. Adult education opportunities were also available. Acclaimed by some historians as a model for fair treatment of workers in British society, the Quaker chocolatiers exercised their social conscience in practice. Detractors of industrial paternalism, however, saw it as patronizing.

Other Quakers such as Rowntree in York, England, helped to establish Quaker dominance in the British chocolate trade through much of the nineteenth and twentieth centuries. Henry Rowntree and his brother Joseph were committed Quakers who promoted and practiced temperance and held regular Society of Friends meetings in their homes. The benefits they extended to their workers reflected their Quaker values. Their chocolate enterprises popularized and marketed chocolate in Great Britain and, through trading partners, in Europe and the United States. They apparently influenced Milton Hershey. While not a Quaker (he was raised Mennonite, but professed no religion), Hershey appeared to emulate the Quakers in their socially conscious business dealings, fair treatment of employees, and attempts at ethical trading. Hershey built the town of Hershey, Pennsylvania, in support of his workers and shared profits with his community in educational and philanthropic ventures (Hershey n.d.).

It was not just among the Quakers that the ethics of chocolate cultivation and production caused some soul-searching. Over the decades of the nineteenth century, Dutchman Coenraad Van Houten (who developed a press to make cocoa powder in 1828), Swiss Henri Nestlé (who shares credit along with Swiss chocolatier Daniel Peter in the 1876 invention of milk chocolate), and Hershey of Pennsylvania had to contend with the uncomfortable reality that slaves were forced to provide much of the labor that went into the growing and production of cacao. By the nineteenth century, demand exploded for the cacao bean and the delicious confections it went into. So did profits from its manufacture and sale. When William Cadbury heard rumors that more than half of the cacao used in his and Fry's chocolate operation was produced by slave labor, he undertook a study find the truth. The West African island of São Tomé, a Portuguese colony where most of Cadbury's supply originated, was indeed relying on a system of virtual African slave labor. Although it took years, and immense media and public pressure, eventually the Quaker chocolate companies in England, several chocolate makers in Europe, and Hershey in the United States began boycotting Portuguese chocolate (Prinz 2017).

Prior to World War II, the Hershey Company (and possibly Nestlé) teamed up with the U.S. military to develop the Field Ration D bar, aimed at supplementing the diet of GIs. It was developed as an emergency ration with a less than desirable taste (to prevent soldiers from just eating it as a confectionary snack) and to hold up in a soldier's kit under hot battle conditions. Unfortunately, even though it is estimated that more than three billion of these bars were produced between 1940 and 1945, soldiers almost universally detested it (Hershey Archives 2018). Although cacao had provided nourishment and energy for Aztec warriors of old, U.S. soldiers during World War II did not much like the Field Ration D bar. In spite of that negative encounter with chocolate, the candy took on a new role as a symbol of peace in postwar Europe. During the Berlin airlift (1948–1949), pilot Gail Halvorsen noticed the excitement of children in East Germany over the prospect of getting gum and candy bars. Operation Little Vittles was born. Halvorsen, “the chocolate pilot,” and his crew began dropping “candy bombs” in the Eastern sector. The idea caught on, and became a symbol of American goodwill, with over twenty-five tons of candy dropped using 250,000 mini-parachutes. The power of chocolate as a diplomatic tool helped to mend some of the postwar tensions among allied nations and contributed toward ensuring the eventual success of the Berlin airlift (Volk 2016; American Experience n.d.).

The cocoa bean, which had over the centuries played a role in creation stories, had been a symbol of the gods, achieved the status of money, and had been a part of religious celebrations and ceremonies, was now fully embraced in modern times, both for its symbolic significance and for its desirability as a delicious and healthy confection enjoyed the world over. In a complex history that involves deep, dark evil, such as slavery, exploitation, and colonialism, chocolate also has exerted a powerfully positive influence in its use to gain economic stability, to help finance workers' movements and philanthropy, to drive business, and even to become a tool of diplomacy. The spirit of chocolate endures in economic power, in cultural significance, and in its influence that weaves itself through the stories of humankind whose lives it touches.

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Putting the Sweet in Popular Culture

Chocolate and the Arts

Michael J. Stein

Through the centuries, artists of most, if not all, artistic mediums have used chocolate as an element of metaphor, symbol, and mood setting, and to capture a moment in time. Early in George Orwell's novel *1984*, the protagonist, Winston Smith, watches a newsflash concerning a glorious victory in India. Winston, a realist, anticipates bad news to follow. "And sure enough, following on a gory description of the annihilation of a Eurasian army with stupendous figures of killed and prisoners, came the announcement, that, as from next week, the chocolate ration would be reduced from thirty grams to twenty." Winston belches some bad gin. Orwell's graphic description of bland, colorless food emphasizes how chocolate provides some measure of relief to the horrid cuisine in Winston's world. He continues to watch the newsflash as he is ordered to do. "The—perhaps to celebrate the victory, perhaps to drown the memory of the lost chocolate—crashed into 'Oceana 'tis for thee'" (Orwell [1948] 1961, 25).

For Winston and his compatriots in Orwell's dystopian world where totalitarianism, or Big Brother, wields an iron fist, losing part of their chocolate ration is simply a passing event, a brief mention in a newsflash before they stand up for the state anthem. But it is interesting to note that Orwell used chocolate as one comforting element in a society torn apart by war and revolution.

Countless examples of chocolate in world culture date back thousands of years. From ancient paintings we learn that the Maya, who populated southern Mexico and northern Central America, were perhaps the earliest civilizations to prepare and drink cacao as a beverage. Recent research indicates that about 3,600 years ago, the Maya cultivated a rare variety of cacao, Criollo, which is found in Central America (Blakemore 2018).

Although the French cannot claim they invented chocolate, over the centuries French artists in particular utilized chocolate in its many forms as an element in

their artistic creations. Dating back to the sixteenth century, an engraving in Girolamo Benzoni's 1565 book, *La Historia del Mondo Nuovo* (History of the New World), depicts Maya revelers in the midst of their nocturnal festivities. In the lower right corner of the woodcut, a celebrant froths chocolate, apparently intended to keep the Mesoamericans awake and alert. Benzoni himself was disgusted by chocolate. After exposure to the drink in Nicaragua he wrote that it "seemed more like a drink for pigs, than a drink for humanity." An image from the *Tudela Codex*, a sixteenth-century document written in Mexico, shows a Nahua woman, apparently of high social rank as judged by her clothing, frothing chocolate by pouring it from her eye level to a ceramic cup on the floor (Norton 2006).

In eighteenth-century France, the upper-class use of chocolate was depicted in paintings such as François Boucher's *Déjeuner*, or *The Breakfast* (1739). The informal scene shows a wealthy family, including two small children, drinking chocolate. (Art historians say it is possible the family is consuming coffee.) *Madame Du Barry at Her Dressing Table* by Jean-Baptiste André Gautier d'Agoty shows the royal mistress after being served a cup of chocolate by a young Black servant known as Zamore. Upper-class women would often be served breakfast in their private chambers. One can only surmise from the painting that Madame Du Barry is being served chocolate (Grivetti and Shapiro 2009).

Chocolate gained greater fame in France under Louis XV. French culture, art, and literature, while not dripping with chocolate in a variety of forms, included several depictions of chocolate as part of erotic imagery.

As the Baroque Age came to a close in the late eighteenth century, chocolate became associated with idle clergy and nobility of Catholic absolutist regimes. A favorite motif for artists was the breakfast scene, where perhaps a noble woman is seen, often in bed, dressed but revealing ample flesh, casually sipping her morning chocolate accompanied by various menfolk (Gordon 1993).

Chocolate sweetened daily life for French citizens in the seventeenth and eighteenth centuries. Therefore, it seemed natural that it be portrayed in the country's art. *La Tasse de Chocolat* (1768) by Jean-Baptiste Charpentier depicts the family of the Duke of Penthièvre enjoying a chocolate drink. The significance of the work is that the beverage was consumed mostly by the wealthy elites of the time. Chocolate was a family and social event among the upper classes. In *The Proposal* (1775), by Louis Marin Bonnet, a man is seen proposing to a woman amidst a scene of opulence and elegance. The room includes flowers, a statue and a *chocolatière*, or chocolate pot, which is a device believed to be invented in France in the 1600s and used to create froth in chocolate drinks (Coe and Coe 1996).

Throughout Europe during this period, chocolate was perceived to be an aphrodisiac. Men and women often gave chocolate to their lovers (Doughty 2015). Whether or not the *chocolatière* represents a gift to the woman or symbolizes their love is in the eye of the beholder.

Henri Matisse in the nineteenth century was smitten enough by a chocolate pot he and his bride received as a wedding gift that he used it as an element in dozens of his paintings. Drawn to the pot's exquisite design, Matisse placed it on a book sitting on a stool in *Still Life with Chocolate Pot* (1900); used it as a vase in

Bouquet of Flowers in a Chocolate Pot (1902); and placed it much more discreetly in *Interior with Young Girl Reading* (1905–1906). The young girl was his daughter Marguerite, who was often a model for Matisse's paintings (Hart 2017).

Trading cards are something of a targeted media for promoting particular products, including chocolate. Trading cards, as we know them today, have more than a century of history and encompass a broad range of interests, including sports (baseball cards being most prominent), music, films, games, and hobbies.

A precursor to the modern trading cards one would find at a hobby store or on eBay is the “trade card,” which was used to advertise products such as soap, soft drinks, tobacco, furniture, stoves, sewing machines, and tools. Trading cards were an inexpensive and effective way to advertise products. The height of their popularity was from the mid-1870s to the early 1900s. Expositions such as the St. Louis World's Fair were occasions where companies could mass distribute their product cards to potential customers. Druggists' counters especially had a variety of trade cards in the hopes of attracting patronage. Exhibitors at the 1876 Centennial Exhibition in Philadelphia distributed beautifully illustrated cards that promoted tools and machinery, patent medicines, and many other wares (PBS n.d.).

As one might guess, chocolate was a favorite category for trade cards. Chocolatiers of the era, such as Cadbury, Hershey, Whitman, and others, were quick to adopt the trade card advertisement concept. Grocery store patrons might receive a trade card prize in their bags. Some cards were designed with punch-out pinholes so customers could string them up in a window. Some cards had folding instructions that would result in a three-dimensional display (Py-Lieberman 2015).

Manufacturers' primary objective during this era was to promote the health and vigor that resulted from chocolate consumption. In Britain, cocoa “imparted new life and vigour to growing children.” A Massachusetts chocolate maker claimed its product to be a “perfect food.” Another said chocolate “sustains against fatigue” and “increases muscular strength.” Chocolate promotions were produced in various shapes and sizes and used as advertising displays inside and outside a retail store. They often came with a prepunched hole at the top and hung from the ceiling or dimensional cards with wings that folded out and stood at a counter (Grivetti and Shapiro 2009).

Elements used in the larger show cards were incorporated into the trade cards. Rowntree's Elect Cocoa was touted on a card that opened up to reveal a cup of the product. Van Houten went so far as to create a card that pictured Holland's famous windmill. The vanes on the card would actually turn to create a visual effect. Instructions on the back of the card included where to bend the card to prop it upright (Grivetti and Shapiro 2009).

Trade card producers were also keen to offer interesting and informative facts along with the advertising. Customers could learn about a variety of bird species from Royal Dutch Chocolate trade cards. Cadbury produced cards with nature scenes.

Chocolate makers that utilized trade cards could always fall back on the tried-and-true advertising theme: children. The medium was filled with images of cherubic moppets, young siblings, or youngsters sipping cocoa, often in the company of pets or dolls (Grivetti and Shapiro 2009).

In 1936, Nestlé introduced a set of trading cards that featured the era's most famous film stars. As giveaways with Nestlé chocolate products, each card contained a photo and story about celebrities such as Shirley Temple, Laurel and Hardy, Ginger Rogers, Mae West, and Mary Pickford—about one hundred in all (Immortal Ephemera n.d.).

A few years later, in the midst of World War II, Nestlé produced posters touting its contribution to soldiers overseas as well as the health benefits of its product. "Chocolate Is a Fighting Food" was emblazoned under an illustration of a rugged, handsome GI eating a chocolate bar while battles blazed all around him.

Commercial chocolate posters had a fairly short history, but in their time reflected the public's shift in chocolate preference from liquid to solid products. Posters advertising chocolate in the late nineteenth century also followed that

trend. Not surprisingly, Swiss and French candy companies produced the majority of the posters during that era. Color lithographs of children were dominant in chocolate company posters in France. They were depicted consuming chocolate while engaging in games or playing with dolls. Many showed girls with their mothers or a dog or cat. A few posters even illustrated children fighting over chocolate bars or stealing from each other. When men were shown in chocolate posters there was usually an adventure theme, such as two men sitting on the desert sand while a camel laden with boxes of chocolate patiently waited. Swiss companies were also compelled to use children in their advertising lithographs—boys were usually involved in some kind of healthy athletic activity. Romance was a poster theme in both countries, although many fewer examples were found in Switzerland. One Swiss poster depicted a formally dressed woman watching a man conducting an orchestra, but instead of a baton he held a chocolate bar. Other examples of



A woman poses with an impressive stock of retail chocolate in this advertising card for McCobb's Cocoa and Chocolate, 1880–1890. Henry McCobb, from Maine, operated a chocolate shop in New York. The brand was one of many that did not last long in a hyper-competitive chocolate industry of the late 1800s. But among the vast spectrum of chocolate advertising dating from that period McCobb stands out as one of the few, and apparently the first, to fashion his advertising based on photographs instead of lithographic engravings. (Library of Congress)

chocolate advertising posters were found in Austria, Germany, Holland, Italy, Russia, Monaco, Spain, England, and the United States (Grivetti and Shapiro 2009).

Common elements weave through centuries of literature: love, lust, alcohol, war, murder, to name a few. But chocolate works its way onto the pages of many prolific authors. Agatha Christie's *The Chocolate Box*, a short Hercule Poirot mystery, is told from the perspective of Poirot's associate and opens with a description of Poirot's drink, "a cup of thick, rich chocolate which I would not have drunk for a hundred pounds! Poirot sipped the thick brown mess in the pink china cup, and sighed with contentment" (Christie [1923] 2003).

The case focuses on a murderer using prescription pills encased in chocolate to kill a man very much addicted to chocolates who, in fact, kept a box near his chair. After recounting the case to his associate, Poirot states his failure was missing the obvious clue: "The chocolate box!" (Christie [1923] 2003).

British author Graham Greene's novel *The Heart of the Matter*, set during World War II, includes a metaphoric phrase that could apply to most anyone at most anytime: "It was like having a bar of chocolate shut in the bedroom drawer. Until the box was empty it occupied the mind too much" (Greene 1948, 188).

Victorian writer Wilkie Collins utilizes chocolate to move the narrative forward in his novel *I Say No*. A letter received by the heroine, Emily, from her friend Cecilia includes the postscript: "I have formed a new habit. In case of feeling hungry in the night, I keep a box of chocolate under the pillow. You have no idea what a comfort it is. If I ever meet with the man who fulfills my ideal, I shall make it a condition of the marriage settlement, that I am to have chocolate under the pillow" (Collins 1886, 74).

Orwell makes another chocolate reference in 1984 when Winston receives a very unusual piece of chocolate from Julia. This was unlike "the dull-brown crumbly stuff that tasted like the smoke of rubbish fire." This piece from Julia came wrapped in silver paper and stirred up a memory "which he couldn't pin down, but which was powerful and troubling" (Orwell [1948] 1961, 101).

The world of children's literature overflows with titles and themes related to chocolate. Willy Wonka probably comes to most minds as an iconic figure first in literature in Roald Dahl's *Charlie and the Chocolate Factory* and later in films. The protagonist, Charlie Bucket, is one of five lucky children who find a golden ticket that will gain them entry to Wonka's wonderland of sweets. Charlie, an honest, gentle and generous child, sharply contrasts with four spoiled bratty kids whose behavior during Wonka's tour borders on near manic greed. In the quest for a lifetime of chocolate, lessons in morality are played out almost as in a fairy tale with the good and the bad characters clearly delineated (Dahl [1964] 2014).

Chocolat, a 1999 novel by Joanne Harris, is set in a French village during the time of Lent. The protagonist, Vianne Rocher, challenges the strict Lenten traditions of fasting and self-denial using chocolate as a means for self-indulgence and a metaphor for the concept of challenging authority and traditional norms. There is an otherworldly aura about Vianne, as well as her six-year-old daughter, Anouk. Harris hints that Vianne is a witch. The parish priest, Francis Reynaud, is incensed and threatened by Vianne's presence and her plans to open a chocolaterie near the church during the fasting season. After all, there are strict rules that govern the

faithful—namely, his flock. Among other norms Vianne challenges is the belief that it is perfectly okay for men to abuse their wives.

Vianne has had a lifelong dream of operating a chocolaterie. Despite Reynaud's persistent attempts to run her and her daughter out of town, the shop continues to attract the villagers. The ultimate insult for Reynaud comes when Vianne announces a "Grand Festival of Chocolate" on, of all days, Easter Sunday. "Happiness," says Vianne in the novel. "Simple as a glass of chocolate or tortuous as the heart. Bitter. Sweet. Alive" (Harris 1999, 104).

The relatively new comics and graphic novels genre includes chocolate-themed titles. One example is *Death by Chocolate: Redux* by self-published novelist and illustrator David Yurkovich. Yurkovich's hero, Agent Swete, is, as his name implies, composed of organic chocolate. Working for the FBI's food crimes division (what else?), Swete investigates crimes emanating from mad scientists to pasta-crazed mobsters to chocolate fanatics (Yurkovich 2007).

Just how far can you take the theme of crime confectionary? G. A. McKeve's Savannah Reid takes on a number of caloric-based plots in twenty-six cozy mysteries with sugary sweet titles such as *Just Desserts*, *Bitter Sweets*, *Cereal Killer*, *Sugar and Spite*, and, yes, *Death by Chocolate*.

Both *Chocolat* and *Charlie and the Chocolate Factory* were successfully adapted for film. For its 1971 production, the title character switched from Charlie to Willy Wonka, who was brought to life by Gene Wilder. Whether manifested in the book or the movie, the plot could have reasonably been laid out had the factory made cheese, or malted milks, or even toys. But Dahl's chocolate factory provided enough magical attraction for children to yearn for one of the magic tickets.

The 2000 movie *Chocolat* was filmed in the medieval village of Flavigny-sur-Ozerain and billed as "sinfully delicious." Reviewers did not spare the metaphors. For example, the *New York Post*'s Lou Lumenick called the movie "the soothing cinematic equivalent of a warm cup of decadently rich cocoa" (Lumenick 2000). *Chocolat* won five Academy Awards, including Best Picture.

Chocolate is still an oft-used fictional vehicle to deliver slow doses of poison to an unsuspecting victim. One example is found in the 2000 French psychological thriller *Merci pour le Chocolat*, which was based on American author Charlotte Armstrong's 1948 (2020) novel *The Chocolate Cobweb*. Virtuoso pianist André Polonski is first married to Mika, the owner of a Swiss chocolate company. He leaves her for Lisbeth and the two have a son. After she dies in a car accident, André remarries Mika, but tensions ensue as he is wrapped up in his music while abusing sleeping pills and neglecting Mika. Playing the role of a good housewife, Mika prepares a cup of chocolate for him every night. Later, a young pianist, Jeanne, who could be André's daughter, arrives in the household. Jeanne suspects Mika is slipping poison into André's chocolate and has something to do with the death of Lisbeth (Bradshaw 2001).

In a movie catchphrase that has become a cliché since the film was released in 1994, Forrest Gump, portrayed by Tom Hanks, compares his existence to a collection of confectionary: "My momma always said life is like a box of chocolates. You never know what you're gonna get."

The metaphor is familiar, however. The unopened box; life is mysterious until one opens up the variety of possibilities that await you. Still, we do not know how each chocolate tastes until we bite into it. We pick and choose; we might want a large piece of chocolate versus small. We might get chocolate filled with something abhorrent, at least to us. We might be disappointed that there are only a dozen pieces as opposed to two dozen, and we are left with a feeling of emptiness. Forrest appears to be simply saying, “that’s life, folks,” using as a symbol chocolate. We take a bite of the unknown, but it is much more than that. It is appreciating and savoring the taste (Schenk 2017).

The Beatles’ “Savoy Truffle,” written by George Harrison, was apparently inspired by friend and fellow musician Eric Clapton’s love of chocolate. Harrison pulled many of the confectionary names, like creme tangerine, Montelimar, and coconut fudge, from a box of Mackintosh’s Good News chocolates. In a 1979 interview, Harrison said, “‘Savoy Truffle’ is ‘a funny one written whilst hanging out with Eric Clapton in the Sixties. . . . He always had toothache but he ate a lot of chocolates . . . once he saw a box, he had to eat them all’” (Guesdon and Margotin 2013).

American singer/songwriter Rufus Wainwright’s “Cigarettes and Chocolate Milk,” recorded in 2001, spoke of his desire for a less-than-healthy lifestyle: “Cigarettes and chocolate milk; These are just a couple of my cravings; Everything it seems I like’s a little bit stronger; a little bit thicker, a little bit harmful for me” (Songfacts 2021).

British musician Elvis Costello’s 1986 album *Blood and Chocolate* does not include any tracks with references to chocolate. However, Costello’s partner at that time, Bebe Buell, claimed the title came from her habit of demanding chocolate when she had her period (Buell and Bockris 2001).

American blues singer/songwriter Tom Waits’s satirical 1999 song “Chocolate Jesus” chronicles a lad who visits a candy store every Sunday to buy a chocolate Jesus: “Well, it’s got to be a chocolate Jesus; Good enough for me; Got to be a chocolate Jesus; It’s good enough for me” (Jones 2014).

Jesus depicted in chocolate also is a part of contemporary visual arts, and, as one might expect, it is controversial. *Trans-Substantiation 2*, a 1994 sculpture by Richard Manderson, depicted a life-size chocolate Jesus intended for consumption. Manderson filled a mold with fifty-five pounds of melted chocolate to sculpt an image of Christ in a crucifix position and used string dipped in chocolate for the hair.

The sculpture title refers to the Catholic doctrine that believes, during the Eucharist, the sacramental bread and wine actually become the body and blood of Christ. Manderson’s ironic work suggests that Jesus’s body instead transubstantiates into chocolate during the Easter season and that secular candy-based festivities have taken precedence over the awesome weight of Jesus’s death and resurrection (Jones 2014).

Two other chocolate Jesus works, perhaps a little less bombastic than Manderson’s, were *Jesus on the Cross* by George Heslop (2006) and *My Sweet Lord* by Cosimo Cavallaro (2007). Heslop, a British artist, sculpted a life-size Jesus on the crucifix in protest of retail opportunism, the ways in which companies exploit religious holidays for profit. Cavallaro’s *My Sweet Lord* was more controversial

than Heslop's work: first, in that it was displayed in the United States where it was subject to scrutiny by the religious right, and second, in that the image of Christ in a cruciform pose was nude. Intended for display during Holy Week at a gallery in Manhattan, pressure from the Catholic League led to it being shut down. Cavallo, who was raised Catholic, said the work was a way of recalling the ecstasy he experienced as a boy during his celebration of the Eucharist and relating it to the experience of chocolate (Jones 2014).

George Bernard Shaw's 1894 play *Arms and the Man* included the expression "Chocolate Soldier," a warrior who was handsome and looked good in a uniform but was otherwise useless. Oscar Straus adapted the play for his 1908 operetta *The Chocolate Soldier*. A film version of Straus's work starring Nelson Eddy was done in 1941 (Shaw [1894] 1913).

A character portrayed in the thirty-fourth of L. Frank Baum's series of Oz novels, *The Wonder City of Oz* (1940) by John R. Neill, is a member of an army of chocolate soldiers. In 1934, Walt Disney released the animated short *Hot Chocolate Soldiers*.

A few authors have found death and chocolate to be a lyrical combination. In the 1985 comedic play *Death by Chocolate* by Paul Freed, death strikes a health resort. The victims include members and the famed chef Edith Chiles. Clues point to a sinister box of chocolates (Concord Theatricals n.d.).

Over the centuries, humankind has connected a plethora of ordinary and extraordinary items in daily life to sex. Chocolate is no exception. The Aztecs may have been one of the first people to link the cocoa bean to sexual desire. Emperor Montezuma, who purportedly enslaved dozens of women for sex, apparently consumed large amounts of cocoa to fuel his lust. This led to many children, according to Spanish chroniclers. Modern research attributes the possible aphrodisiac qualities of cocoa to tryptophan, a building block of serotonin, which is a chemical component of sexual arousal. Today, however, most researchers have found that chocolate's qualities as an aphrodisiac are more likely psychological, not physiological (O'Connor 2006). Evidence that chocolate as a narcotic for sex has ebbed in modern times may be found in pop singer Sarah McLachlan's 1994 song "Ice Cream," in which she sings, "Your love is better than chocolate; better than anything else that I've tried" (Song Search n.d.). Montezuma might have disagreed.

SELECTED CHOCOLATE REFERENCES IN NOVELS, FILM, AND MUSIC

Novels

Arnold Adolff, *Chocolate Dreams*, 1989. Poetry about chocolate for children.

Patrick Skene Catling, *The Chocolate Touch*, 1979. John acquires magic ability to turn everything he touches into chocolate.

Diane Mott Davidson, *Dying for Chocolate*, 1993. Lighthearted culinary mystery.

Charles Dickens, *A Tale of Two Cities*, 1859. Dickens ridicules Monseigneur for his pompous chocolate-consuming habit.

- Enid Fetterman, *Bittersweet Journey*, 1998. Novel of a woman named Charlotte, who searches the world for emotional and gustatory satisfaction and visits renowned chocolate shops.
- Eileen Goudge, *Such Devoted Sisters*, 1992. Two sisters are chocolatiers and rivals for affections of same man. In-depth look at chocolate making.
- Fred Gwynne, *A Chocolate Moose for Dinner*, 1976. Young girl imagines the things her parents discuss, such as a chocolate moose.
- Harriet Herbst, *Chocolate Mouse*, 1988. Dublin mother worries her love for chocolate will make it difficult to cope.
- James Howe, *Harold and Chester in Hot Fudge*, 1990. Harold the dog narrates story about himself searching for fudge.
- James Joyce, *Ulysses*, 1920. Two central characters share a cup of cocoa. Notes how cocoa had become part of the fabric of daily life.
- Robert Kimmel Smith, *Chocolate Fever*, 1972. About a young boy who loved to eat chocolate.
- Barbara Whitehead, *Sweet Death Come Softly*, 1992. Mystery about charming Belgian chocolate maker who comes to York, England.

Movies and Plays

- Arms and the Man*, by George Bernard Shaw, 1894. A box of chocolates is used as center stage of plot.
- Bean to Bar*, 2014, a film about artisan chocolate, Binary Recording Studio.
- Better than Chocolate*, 1999.
- Blood and Chocolate*, 2010.
- Bread and Chocolate*, 1974.
- Chalk & Chocolate*, documentary, 2009.
- Charlie and the Chocolate Factory*, a remake starring Johnny Depp, 2005.
- Chocolate*, 2000.
- Chocolate*, 2007.
- Chocolate*, 2008. Action drama.
- Chocolate*, 2017.
- Chocolate Brown: Music Comedy*, by Spencer Williams, 1921.
- Chocolate City*, 2015.
- Chocolate City: Vegas Strip*, 2017.
- Chocolate: Deep Dark Secrets*, 2005.
- The Chocolate Frog: A Comedy in One Act*, by Jim McNeil, 1971.
- Chocolate Perfection*, documentary, 2014.
- The Chocolate War*, 1988.
- Dark Chocolate*, 2016.
- The Dark Side of Chocolate*, documentary film, 2010.
- Desperate Chocolate*, 2015.
- Desperate Chocolate—Chanel's Story*, 2016.
- Faith, Love and Chocolate*, 2018.
- Forrest Gump*, 1994.
- Great Chefs: Chocolate Passion*, 1996.

Half Chocolate, 2018.

In Search of the Heart of Chocolate, a Chocumentary by Sarah Feinbloom, 2008.

Lessons in Chocolate, 2007.

Like Water for Chocolate, 1992.

Merci pour le Chocolat, 2000.

Milton Hershey: The Chocolate King, 1995.

No Chocolate, No Rice, 2018.

Romantics Anonymous, French, *Les Émotifs anonymes*, 2010.

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Politics, Exploration, and Military

Cocoa for King and Country

For most of its history, chocolate was a luxury product. It was special and so comparatively expensive, not only in Europe and North America but also in the Aztec Empire of what is today Mexico. Cacao can be grown only in a swath around the equator and then only when conditions are reasonably moist and shaded. It must be harvested, processed, and shipped—or carried on human backs—for more than 1,600 miles (about 2,600 km) as was the case between the cacao farms of Soconusco and the Aztec capital of Tenochtitlán, modern Mexico City.

Rarity dictates value, and price defines luxury. Luxuries also attract taxes. Chocolate to the Aztecs was a symbol of aristocratic status, a ration for the military, and a requirement in religious ritual. As it could not be grown around the capital, it became a commodity demanded from cacao-growing regions as a tribute to the rulers. Its value in Mesoamerica drove the cocoa beans themselves into use as a form of money. Joseph de Acosta, one of the earliest Spanish observers of Mesoamerican customs, noted, “They use it instead of money, for with five Cacaos they buy one thing, with thirty another, without any contradiction; and they use to give it to the poor that beg for alms” (De Acosta [1590] 1604).

The value of this precious commodity made it an obvious political tool. Governments, first in the New World colonies and then in the Old World, devised ways to enrich their treasuries by taxing and regulating the trade of cocoa beans and manufacture of chocolate. The two monarchies whose explorers first claimed Central and South America, Portugal and Spain, tried early on to establish a monopoly on cocoa trade. After the Treaty of Tordesillas in 1494 split the New World into a Portuguese zone (Brazil) and a Spanish zone (the rest), the Spanish responded by jumping to slap a monopoly on all New World products, including cocoa beans. Fifty million Indigenous people living in the Americas were not consulted, nor was any other European power that happened to take an interest in the now obviously valuable cocoa trade. The Spanish crown could reap profit not only

by controlling the tribute system as originally established by the Aztecs but also by requiring all cocoa beans to be shipped from its colonies directly to ports controlled by the Spanish. The trade could not only be taxed—and it was, sometimes heavily—but also be controlled through licensing monopoly rights to individuals or guilds. By the early 1600s, original sources of cocoa beans in southern Mexico and Guatemala no longer could keep up with demand. Spain looked toward its colonies in South America, particularly Venezuela and Ecuador, to extend its monopoly (Squicciarini and Swinnen 2016).

As Spain's economy became increasingly strained by war and its power in the New World challenged, its monarchs tried desperately to retain the profitable cocoa-bean monopoly. But privateers or the navy from its nemesis, Britain, challenged its ships on the sea and confiscated the valuable cargo, soon including cocoa beans. As early as 1656, the European press reported that the British had successfully attacked Spanish ships to gain "a charge of Cocoa, which they sent to My Lord Protector all the fruit that was needed to make a beverage which they call Chocolate" (*La Gazette* 1656, 1343). The socially conservative Oliver Cromwell, who ruled England under that title until 1658, may not have understood the popularity of chocolate, but certainly the king did under the Restoration of 1660.

By the end of the century, cocoa became the rage of London and the Continent. The British navy captured Jamaica in 1655, immediately turning the cocoa-producing island into a challenging presence to Spanish monopoly claims. The Netherlands had captured Curaçao two decades before. Only about forty miles from the coast, it offered a perfect shelter for Dutch traders smuggling esteemed Venezuela cocoa, called Caracas, Caraque, or Carack in the European market. The Venezuelan merchants and plantation owners themselves were often complicit in the Dutch smuggling operation, diverting more cacao to Amsterdam than to the supposed monopoly of Spain. In 1728, an exasperated Spanish crown tried to stamp out the operations through a brutal patrol operation, but Spain's attempt to keep a cacao monopoly could not be sustained (Grivetti and Shapiro 2009; Coe and Coe 1996; Presilla 2009).

Portugal's monarchy in turn tried to establish its own monopoly through a burgeoning cacao operation in the Brazilian region of Bahia. Lucrative plantations developed there by the Jesuits ended in 1767 when the Crown expelled the religious order and established state control over the cacao farms. It lasted until Brazilian independence in 1822. When Brazil gained independence, the Portuguese government did not give up on profits from cocoa; it moved the operation across the Atlantic to the island colonies of São Tomé and Príncipe (Squicciarini and Swinnen 2016; Macedo 2016).

While Spain and Portugal tried to establish trading monopolies based on their access to cacao's origin plantings, other European monarchies enriched their treasuries by establishing monopolies on chocolate manufacturing and sale within their own countries. The most pervasive control over cocoa occurred in France, a country that has taxed and controlled chocolate from the 1600s through modern times (Terrio 2000). The first documented regulation began in 1659. Louis XIV granted David Chaliou exclusive rights to sell chocolate. Monopoly rights cost money and so benefited the king's treasury. In January 1692, the Crown tried to

establish royal control over chocolate pricing, fixing the price of chocolate at six francs a pound, four francs a pound for cocoa beans. But the attempt failed. At the end of Chaliou's term, a Paris guild, the *Maîtres Limonadiers*, bought the license. The guild continued to hold its monopoly with only brief interruption until the Revolution (Squicciarini and Swinnen 2016; Harwich 1992). The French government throughout this period frequently revisited its taxes on luxury items, notably coffee, tea, and chocolate. Newspapers reported numerous changes in tax structure on chocolate beginning in 1689 (*La Gazette* 1689–1760, *passim*).

The British Crown established a state trade monopoly in 1651 by forbidding foreign ships to bring goods to England, but at that time British colonial holdings did not include cacao-producing areas. It changed in 1655 when Britain acquired Jamaica, and during the Seven Years' War (1756–1763), commonly known as the French and Indian War in North America, it gained control of Grenada, St. Vincent, Trinidad, and Dominica, all cocoa-growing islands. Cocoa beans flowed from those areas to England and the British American colonies (Grivetti and Shapiro 2009). As chocolate, along with coffee and tea, gained popularity in Britain in the mid-1600s, the government found it uncontroversial to levy taxes as the new drinks were considered luxuries. Excise taxes, requiring consumers to pay the government for the privilege of consuming chocolate, began in 1660; chocolate was taxed at eight pence per gallon but did not bring in much revenue. In 1724, the government entirely banned manufactured chocolate imports to Britain as a way to remove a regulatory loophole that taxed beans but not prepared chocolate imports. The ban would, the government hoped, encourage growth in domestic chocolate manufacture (Loveman 2013; Grivetti and Shapiro 2009).

Chocolate tariffs, taxes for imported products, attracted several countries over centuries of chocolate use. Cocoa-bean trade was regulated in Spain, France, and Britain until the mid-nineteenth century, as governments tried to raise revenue to pay for wars and to encourage development of their own colonies' cacao farms. Monarchies and the states that controlled cocoa-producing colonies could collect revenue on the sale of cocoa in both paste and powder forms. In Germany, seeing its first chocolate house in 1673 in Bremen, a 10 percent tax on cocoa as a luxury good helped to keep chocolate from becoming affordable beyond the upper classes. High duties in the North American colonies also kept chocolate out of reach to those who did not have means, and so the drink of the Americas often took a secondary role to the cheaper coffee and tea. After colonial rebels boycotted tea following London's unpopular decision to tax the beverage, Thomas Jefferson advocated chocolate as a replacement. But tea and coffee eventually found greater favor after the American Revolution (Forrest and Najjaj 2007; Squicciarini and Swinnen 2016; Ritter Sport n.d.).

The weight of European taxes lightened in the mid-1800s, contributing to a chocolate boom. A move in several European nations toward free trade encouraged an end to taxes and fees on cocoa beans and chocolate. But taxes continued to come and go; Belgium's now-famous fine-chocolate industry did not grow until the government removed taxes on raw materials after World War I (1914–1918).

By the twenty-first century, however, some chocolate manufacturers worried about greater chocolate regulation and possibly new taxes. In Britain the reason this time was not government revenue generation; it was concern over public health. UK government health authorities perceived sugar in confections and other foods as a culprit in the country's growing challenge of childhood obesity and its associated health issues. In 2018, Britain levied a sugar tax on soft drinks. Chocolate manufacturers anticipated that a sugar tax could be extended to their products. Public Health England, a government agency, in 2020 recommended no more than 43.7 grams of sugar per 100 grams of chocolate. Some mass-market chocolate bars had far more sugar and far fewer cocoa solids. The average British chocolate bar contained 54.6 grams of sugar (Barbieri 2019; Nieburg 2017).

A good share of government cocoa tax revenue supported military campaigns. But that is not the only way chocolate helped governments maintain troops. The food itself often became a military staple, sustaining soldiers with a high-calorie and slightly stimulating beverage or bar. Chocolate accompanied soldiers from the time of the Aztecs. Ground and pressed into wafers, it was a convenient carry not only for Aztec soldiers but for later Spanish soldiers. The wafers could be conveniently shipped; chocolate would resist spoilage and, combined with toasted maize (corn), could sustain native soldiers on the march (McShea, Leissle, and Smith 2009; Coe and Coe 1996). As early as 1662, Henry Stubbe reported that British troops in Jamaica could survive solely on chocolate paste with sugar dissolved in water (Stubbe 1662; Dillinger et al. 2000). As chocolate became more common and costs more approachable, by the 1700s some European armies began to include cocoa in soldiers' rations. Ample evidence indicates both the British and the Americans included chocolate during the French and Indian War and the American Revolution. Benjamin Franklin purportedly supplied chocolate to British military leaders before colonial relations soured (Miller 2021).

A grisly account of an ambush during the French and Indian War near Lake George in New York State includes evidence of the extent to which British troops relied on chocolate rations. The "Chocolate Massacre" of 1758 is described by a witness referenced in an 1885 edited history: "Among the supplies were a large number of boxes of chocolate which had been broken open and their contents strewn upon the ground, which, dissolving in the fervid heat of the summer sun, mingled with the pools and rivulets of blood, forming a sickening and revolting spectacle" (Smith 1885, 106).

By the end of the 1700s, chocolate had become such a standard expectation of military commanders that it was made a formal requirement of British navy rations. In 1783, naval records indicated a change from butter and cheese to cocoa and sugar. It was considered not only nutritious for military men who had high-calorie needs, but it could also possibly counteract scurvy. (They were not quite off track, as chocolate does contain trace amounts of Vitamin C.) J. S. Fry landed the contract as official supplier of chocolate to the navy, boosting its stature toward a rise to the world's largest chocolate manufacturer in the later 1800s. Fry also sent its chocolate with British troops during the Crimean War (1853–1856) (Wagner 1987; Prinz 2017; Cadbury 2010).

Based on numerous contemporary references, historians have concluded chocolate was part of every U.S. military campaign since the American Revolution. Its use during the U.S. Civil War (1861–1865), however, was not formally mandated as part of a soldier's rations. U.S. Army regulations of 1861 did not include chocolate among its list of required foods or beverages. It did include coffee and tea (U.S. Army 1863). By World War I, however, chocolate rations became an expected part of the U.S. Army, associated with the need for quick energy and calories. Hershey offered individually wrapped chocolate, encouraging an American postwar rise in the popularity of candy bars (Farfaglia 2018; Brenner 1999). A significant problem with the modern candy bar, however, usually milk chocolate, was its low melting point. Bar chocolate did not stand up to harsh battlefield conditions. Major U.S. chocolate makers Hershey, Mars, and Nestlé worked with the military in the 1930s to produce a robust, energy-dense chocolate capable of sustaining soldiers in the field. But military leaders dictated that it should not be very tasty, as soldiers would then be tempted to snack on a food that was meant for emergencies. In a peculiar quest for a chocolate manufacturer, Sam Hinkle, Hershey chief chemist, was tasked to produce a product that did not taste good. The result was chocolate that was not very sweet—one attraction to most chocolate lovers—and added oat flour to the point where it resembled clay, with an apparently similar taste. But it did not melt at temperatures up to 120°F and contained 600 calories. It was packaged as Ration D. Some evidence indicates Nestlé chemists in Fulton, New York, actually came up with Ration D; both companies produced it for the military (Hershey Archives 2018; Brenner 1999; Farfaglia 2018).

Ration D was apparently so unappealing that during World War II the military asked Hershey to improve the taste a little bit. In 1943, it issued the supposedly more palatable Tropical Bar. Soldiers reported that while it really did not taste any better, it was more nicely wrapped. Hershey's Tropical Bar hung around for decades, consumed by troops in Korea and Vietnam; in 1971, Apollo 15 astronauts carried it on a flight to the moon. Soviet Union astronauts also included chocolate on their flights (Lewis 2015; Hershey Archives 2018).

Hershey discontinued the Tropical Bar shortly after the end of the Vietnam War. Chocolate makers since have worked to come up with a more reasonable chocolate that can stand the rigors of the military. M&M's, the now-famous Mars lentil-shaped chocolate with a hard candy coat, offered one possibility, and it was made part of soldiers' Ration C beginning in 1941. After the war, Mars introduced M&M's to the civilian public, advertising it as "the chocolate that melts in your mouth, not in your hand." It has since become Mars's most popular chocolate product (Brenner 1999; Mars n.d.). But research has continued. Hershey offered its heat-resistant Desert Bar to be used in the U.S. 1991 Desert Storm campaign in Iraq. The war ended before many could be issued, so Hershey sold the rest as novelties and ended production (Hall 2016). In 2020, Mars announced a heat-resistant chocolate based on a cocoa-butter alternative and organic sweeteners called polyols. Cadbury and Nestlé also recently patented their own heat-resistant chocolates, but as of 2020 none had been put on the market (Southey 2020).

Early explorations and expeditions of North America, the North and South Pole, or mountains such as Everest reflected influence of military campaigns, sometimes including military officers and troops. As such, they also found need for a high-energy and stimulating food such as chocolate. In an early documented expedition use, Alexander Henry in 1776 told in his journal of the power of chocolate to boost morale. Traveling in Canada during the winter, the British fur trader and explorer wrote as follows:

On the twentieth the last remains of our provisions were expended but I had taken the precaution to conceal a cake of chocolate in reserve for an occasion like that which was now arrived. Toward evening my men, after walking the whole day, began to lose their strength, but we nevertheless kept on our feet till it was late; and when we encamped I informed them of the treasure which was still in store. I desired them to fill the kettle with snow and argued with them the while that the chocolate would keep us alive for five days at least, an interval in which we should surely meet with some Indian at the chase. Their spirits revived at the suggestion, and the kettle being filled with two gallons of water, I put into it one square of chocolate. The quantity was scarcely sufficient to alter the color of the water; but each of us drank half a gallon of the warm liquor, by which we were much refreshed, and in its enjoyment felt no more the fatigues of the day. In the morning we allowed ourselves a similar repast, after finishing which we marched vigorously for six hours. But now the spirits of my companions again deserted them and they declared that they neither would nor could proceed any farther. For myself, they advised me to leave them and accomplish the journey as I could, but for themselves they said that they must die soon and might as well die where they were as anywhere else.

While things were in this melancholy posture I filled the kettle and boiled another square of chocolate. When prepared, I prevailed upon my desponding companions to return to their warm beverage. On taking it they recovered inconceivably, and after smoking a pipe consented to go forward. (Henry 1809, 261–262)

In a less hopeful outcome, the 1845 John Franklin Arctic expedition disappeared and was not found until fourteen years later. The entire party had perished. But a search party did discover among surviving provisions forty pounds of chocolate (Grivetti and Shapiro 2009). Other explorers who mentioned chocolate include Zebulon Pike during his 1806–1807 Southwest Expedition, Yukon explorers of 1898, Arctic and Antarctic expeditions of the early twentieth century, Theodore Roosevelt on his 1914 Brazilian expedition, and Tenzing Norgay, who left a little chocolate at the top of Mount Everest as a gift to the gods during his 1953 climb with Edmund Hillary (Grivetti and Shapiro 2009). Team rations during a first winter climb up K2, the world's second highest mountain, in 2020 included four hundred pounds of chocolate (Skolnick and Sharma 2021).

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Preparation

Rituals, Recipes, and Poisons

Of the three exotic stimulating beverages that sprang into popularity during the 1600s, chocolate was the first and the most complex. Processing coffee or tea is a simple matter of roasting and (possibly) oxidizing. Chocolate requires a variety of steps almost impossible to do at home without specialized skills and equipment.

The complexity of chocolate preparation extends as well to its added ingredients. Some fine-chocolate purists today have declared that chocolate should contain only two ingredients: cocoa mass (also called cocoa liquor) and sugar. But the pre-Columbian peoples who introduced the world to chocolate were far more imaginative. Through most of chocolate's history the world concurred: a wide range of additions were nearly ubiquitous, some of them common, some of them rare, and some of them deadly.

Native peoples of Central America prepared chocolate in a variety of ways corresponding to practices of the region and the period. The Aztec Empire of central Mexico by the time of Columbus had built chocolate consumption into a highly refined ritual favoring the elite of society, to the point that unauthorized consumption by commoners was punishable by death. As cacao could not be produced by the Aztecs of Tenochtitlán (Mexico City), it was imported mostly from Soconusco, today in Chiapas state near the border of Guatemala. A rare food difficult and expensive to obtain, chocolate became a prize highly coveted. Aristocrats of ancient Maya culture centered around Yucatán and Tabasco esteemed chocolate as a gift from the gods. We do not know if early Maya elites during the classical period (AD 250–900) had exclusive rights to chocolate as the Aztecs did. But by the time the Spanish arrived there, it had become a common everyday drink sold, according to early chronicler Bernardino de Sahagún, in the daily markets (Sahagún 1577; History 2018).

Mesoamerican ritual use considered chocolate to be a symbol for blood, one possible reason for a habit of preparing it with the red dye annatto. Sahagún wrote that cacao was a metaphor for blood because both were precious, and chocolate's

use in the marriage ceremony signified the mixing of bloodlines. But blood and chocolate sometimes became more than symbolic; researchers have found that in some parts of Mexico knives used in human sacrifices were washed, the water then mixed with chocolate for a beverage (McNeil 2006).

More commonly, however, early Spanish accounts indicated native chocolate recipes usually included the addition of some form of maize, or corn. Maya favored a beverage that combined corn with annatto and chili peppers. Corn, or masa harina, clearly was favored as a thickener, mentioned by Sahagún. Often the result was more of a porridge than a drink, and so it was sometimes eaten as a meal. The ancient use of masa harina is of particular note. The corn-based meal is still used for a traditional Mesoamerican drink called *champurrado*. Masa harina as the base for tortillas is a corn flour soaked in lime water—calcium hydroxide, an alkali. We know that alkalization, the “Dutch process” invented by Van Houten three centuries later, produces a milder, less astringent cocoa more easily mixed with water. Pre-Columbian Aztecs tried adding wood ashes for a similar alkalizing effect, indicating that natives had made efforts to tame the bitterness long before Europeans made the Dutch cocoa process standard (Grivetti and Shapiro 2009).

In addition to corn products, chili peppers were usually part of the native cocoa-based drink. They could be spicy or mild. Spanish Jesuit José de Acosta wrote in the late 1500s that Mexicans invariably added chili peppers, and that Spanish colonists had avidly taken up the custom. The popularity of adding chilis to chocolate also was reflected in recipes of Spanish physician Antonio Colmenero de Ledesma, who in his influential 1631 treatise on chocolate recommended their addition to the drink. Beyond that, early natives usually added “ground up flowers,” likely ear flower, *Cymbopetalum penduliflorum*. The spicy aromatic is still common in Mexican markets (Maya Ethnobotany Themes 2015). But it was difficult to obtain in the Old World, so soon it was replaced by familiar European spices, notably cinnamon and nutmeg, two spices then not known in the New World.

Also unknown to natives was sugar. Research disagrees regarding whether natives commonly sweetened their chocolate, but Sahagún referred to a “honeyed chocolate,” suggesting that sweetened chocolate was not unknown to pre-Columbian Mesoamerica. By Colmenero’s time, however, the addition of sugar to chocolate in Europe had become universal. The physician himself said it “tempers and conserves” the drink (Albala 2007). Because Europeans by the 1600s seldom considered chocolate without the addition of sugar, historians have credited sugar itself for making acceptable what Old World populations at first considered a bitter and unpalatable beverage. The presumption has been that by altering the original recipe a drink that the Spanish had originally considered disgusting turned into an attractive and soon wildly popular beverage (Walker 2007).

Chocolate nevertheless made a slow start in Europe. It became familiar to the Spanish soon after the conquest in the first years of the 1500s. It is documented to have been presented as part of the 1544 gifts from Kekchi Maya nobles to Spanish prince Philip. But no record of cocoa bean shipments to the Old World can be

definitely dated before the 1580s, although likely tablets of chocolate prepared in the New World did reach Spain before that. Little evidence, however, indicates that it was familiar to the rest of Europe before the early seventeenth century.

The snail's pace of chocolate's crawl into Europe's cup has been explained by asserting that the Spanish kept it a secret from other nations (Grivetti and Shapiro 2009). It is known to have been long familiar within the European network of Catholic monasteries, considered to be a medicine, at least ostensibly. But the idea that chocolate became popular in Spain or elsewhere only after it became acceptable to European palates has been challenged by recent historical evidence. Marcy Norton in the *American Historical Review* (2006) observed that chocolate in Spain used the same recipes as the early Mesoamericans. Different spices were added in an effort to retain the original native taste using ingredients more easily obtainable in Europe. Cinnamon in particular became popular in European chocolate, possibly because it had the spicy taste of chili and flowery notes of ear flower.

Colmenero also indicated European ingredients should be substituted for some original native ones. He noted that in the original Mesoamerican recipe, "to every 100 cacaos" should be included "two cods [pods?] of the long red pepper" and "one handful of Annis-seed" with two of the flowers. But in Spain he recommended substitution of "six Roses of Alexandria beat to powder: One cod of campeche, or logwood; two drams of cinamon; almonds, and hasle-nuts, of each one dozen: Of white sugar, halfe a pound: of achiote enough to give it the colour." Colmenero also included a recipe with milk and/or eggs, indicating that their use dates from the beginning of chocolate's popularity in Spain and not from later preferences developed in England and France (Colmenero de Ledesma [1631] 1652).

As for the addition of vanilla, a New World flavor that today has become part of many bar chocolate recipes, research also is inconclusive. Historians know that it was popular in the Americas perhaps all the way back to the beginning of chocolate consumption, thousands of years. It can be used to enhance flavor like salt or, in larger quantities to mask off tastes and provide a soft contrast to the characteristic cocoa bitterness. We also know it was alternatively considered an essential part of healthy consumption or, conversely, something absolutely to be avoided for good health (De la Reynière 1810; Coe and Coe 1996).

By the mid-1600s, as chocolate consumption in Europe, as well as the North American colonies, grew to be a fashionable part of the elite classes, recipes normally still demanded an assortment of spices depending on whether the goal was health, and if so, the medical condition that chocolate was required to address. The addition of sugar was standard. Vanilla and cinnamon also were common, along with nutmeg, allspice, and cloves, lemon peel, possibly milk or eggs, and for the more affluent, the exotic ingredients musk and ambergris. The once-reviled foam became a big attraction, and while the Maya frothed up their drink by pouring from container to container, Europeans soon borrowed the Spanish invention of a chocolate pot with *molinillo*. This type of long-handled whisk protruding from a hole in the top of a ceramic or silver pot



Early European writers often considered the three exotic “new beverages” together. In the frontispiece to the 1685 edition of Dufour’s book, *Traité des Nouveaux & Curieux Du Café, Du Thé et Du Chocolate*, coffee is depicted as a gift from the Arab world, tea from the Asian world, and chocolate as a native American from the New World. At the native’s feet are a chocolate pot and molinillo (stirring stick), although both of those items were Spanish innovations and not part of pre-Columbian native chocolate preparation. (Dufour, Philippe Sylvestre. *Traité des nouveaux et curieux du café du thé et du chocolate*, 1685.)

du caphé, du thé et du chocolate, was mostly a reworking of Colmenero’s 1631 text that had so revolutionized chocolate consumption in Europe (Dufour 1671, n.p.). Considering the enormous library of works on the topic of chocolate that so intimidate us today, we can conclude that de Blégny in 1687 was right about one thing: the topic had not been exhausted.

would be whirled between the hands not only to whip the foam but also to keep the fat from accumulating on the cocoa surface and the solids from dropping to the bottom.

Elegant *chocolatières*, or chocolate pots, became common among the more aristocratic households after 1700. Certainly, keen chocolate drinkers by the 1660s had already set up their own equipment. The English diarist Samuel Pepys first recorded tasting chocolate in 1661; soon he had a whole *batterie de chocolat* in his chambers, where he served it to friends. Nicolas de Blégny, physician to French king Louis XIV, emphasized in his book published in 1687 that taking chocolate or another “new” beverage could communicate status, demonstrate good taste, lubricate social discourse, and encourage enjoyment of urban Paris life (De Blégny 1687; Jones 2013). De Blégny admitted in his introduction that fifteen years before, a book by Lyons merchant and pharmacist Philippe Sylvestre Dufour (pen name for Jacob Spon) had been “a rather complete work” on the topic. He declared that “it seems to me nevertheless that this material is not exhausted” (De Blégny 1687, n.p.). The chocolate section of Dufour’s 1671 book, *De l’usage*

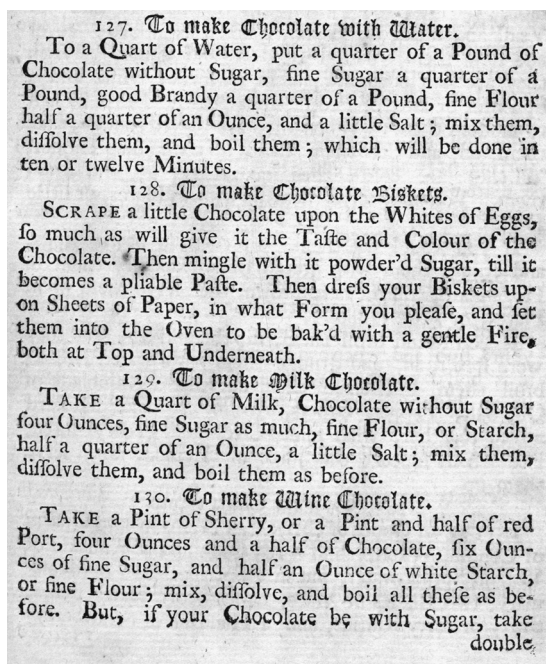
We do not have much evidence that the Sun King loved chocolate. But his son Louis XV (1710–1774) surely did, taking it with great pomp and ceremony. Sometimes he even prepared his own, and we still have a favored recipe:

Place an equal number of bars of chocolate and cups of water in a *cafetière* and boil on a low heat for a short while; when you are ready to serve, add one egg yolk for four cups and stir over a low heat without allowing to boil. It is better if prepared a day in advance. Those who drink it every day should leave a small amount as flavoring for those who prepare it the next day. Instead of an egg yolk one can add a beaten egg white after having removed the top layer of froth. Mix in a small amount of chocolate from the *cafetière* then add to the *cafetière* and finish as with the egg yolk. (McGegan 2017, n.p.)

Chocolate pots with the top hole for the swizzle stick lost popularity after Van Houten's process made the *molinillo* obsolete, but elegant ceramic and silver chocolate sets continued to be popular throughout the nineteenth century and through much of the twentieth. Today they are generally available at a modest price on eBay or in antique shops. The older ones with the hole for a *molinillo* are pricier. Mexican markets also sometimes still sell this style of clay chocolate pot.

Chocolate cups by the late 1600s also became popular, these tracing back to the gourds or clay *jícaras* used to serve chocolate in America. The gourds themselves attracted early Spanish complaints as they spilled easily; a specially designed cup and plate called a *mancerina* grew popular after the mid-1600s, supposedly invented by Pedro Álvarez de Toledo y Leiva, the Marquis de Mancera, Viceroy of Peru (Pérez de Arlucea 2019; Forrest and Najjaj 2007). Chocolate, for much of its history, nearly always was consumed as a beverage; in Europe, it became mostly a breakfast drink. It took on symbolism of the kind of self-indulgent leisure only the privileged of society could afford. The aristocratic woman of the eighteenth century would be presumed to take morning chocolate in her chambers prepared by the servants. Privileged Catholic clergy earned a reputation for decadence symbolized by their rituals of chocolate service. In England, chocolate houses grew to popularity among the wealthy and politically powerful. The leisure classes would meet at famous White's Chocolate House or the Cocoa-Tree for both political debates and gambling or loose living, a lifestyle richly satirized in art and literature.

While drinking chocolate was still by far the standard, by the later 1600s, Europeans had also begun to experiment with cocoa in ways the ancient Mesoamericans certainly never considered. They probably would have thought it scandalous to use their sacred beverage in frilly desserts. While the Earl of Sandwich perhaps invented the familiar lunchtime food, his great-great-grandfather of the same title in 1668 included in his writings a recipe for chocolate ice: take a cup of drinking chocolate “prepared as usual,” add a container of snow with salt, and shake (Loveman 2013). Late 1600s cookbooks featured a variety of often dairy-based chocolate treats, including chocolate cream and chocolate milk. With the early growth of chocolate in creams and pastries, it becomes harder to take seriously the continual cross-current of argument for chocolate as a medicine. But those arguments certainly did



John Nott, chef for the Duke of Bolton in London, published a 1723 compendium of recipes entitled *The Cooks and Confectioners Dictionary*. Recipes included six for chocolate, three of which are shown here. He encouraged liberal use of sugar, suggesting the book was aimed at wealthy users who could afford what was then a luxury ingredient. (Library of Congress)

cuits, and chocolate tart. The book became popular in both England and the United States (Nott 1723, 27–30). For regular drinking chocolate:

To a quart of water, put a quarter of pound of chocolate without sugar, fine sugar a quarter of a pound, good brandy a quarter of a pound, fine flour half a quarter of an ounce, and a little salt; mix them, dissolve them, and boil them; which will be done in ten or twelve minutes.

This was generally declared delicious, if we can believe comments from contemporaries. But for those who preferred milk, and perhaps would skip the alcohol:

Take a quart of milk, chocolate without sugar, four ounces fine sugar as much; fine flour or starch half a quarter of an ounce, a little salt, mix them, dissolve them, and boil them as before.

Or the recipe purportedly particularly popular among the troops:

To make wine chocolate. Take a pint of sherry, or a pint and half of red port, four ounces and a half of chocolate, six ounces of fine sugar, and half an ounce of white starch, or fine flour; mix, dissolve, and boil all these as before, but if your chocolate be with sugar, take double the quantity of chocolate, and half the quantity of sugar, and so in all.

continue throughout the 1700s and through much of the 1800s. Sometimes even today.

In the United States, chocolate consumption by the early 1700s also became a symbol of wealth and privilege, but it did not stay that way. The Boston Tea Party of 1773 helped to cement colonial association of that iconic British beverage with greed and oppression. A tea boycott led influential early American leaders such as John Adams and Thomas Jefferson to encourage chocolate instead for health and nourishment. But Jefferson's hope that it might become the country's preferred national beverage did not see favor from his later countryman; by the 1800s coffee and even tea overtook the older hot cocoa.

In 1723 John Nott, writing his well-known *Cooks and Confectioners Dictionary*, featured six recipes for chocolate, including chocolate cream, chocolate bis-

Chocolate beverages continued to be stylish and celebrated throughout the eighteenth century, but the French Revolution would see a change in its fortunes. Chocolate's history is extensively intertwined with the Roman Catholic Church. The first Europeans who set foot in the New World were from Spain, a country that grew to become arguably Europe's most militantly Catholic, with its powerful Inquisition, aggressive Jesuit Order, and close relationship to the papacy. It seems certain that chocolate spread from Spain first to Italy, and throughout Europe through the church's extensive network of monasteries. Catholic clergy, particularly popes, took to a chocolate habit that became nearly symbolic of the papacy itself.

The obvious close ties between the church, the aristocracy, and their chocolate, particularly in France, certainly boosted prestige of the costly beverage. But those ties became a liability when those Old Regime powers fell into discredit during the French Revolution after 1789. Ridicule of the revolutionaries targeted at the hated aristocracy and clergy included French press descriptions of their supposed effete and decadent manners, chocolate habits among them. It was not the chocolate itself that was offensive, but the class-based rigamarole of preparation and consumption. Charles Dickens in *A Tale of Two Cities* certainly was not the first to lampoon the supposed prissy privilege of French Catholic clergy, but he probably described it most famously:

Monseigneur could swallow a great many things with ease, and was by some few sullen minds supposed to be rather rapidly swallowing France; but, his morning's chocolate could not so much as get into the throat of Monseigneur, without the aid of four strong men besides the Cook.

Yes. It took four men, all four ablaze with gorgeous decoration, and the Chief of them unable to exist with fewer than two gold watches in his pocket, emulative of the noble and chaste fashion set by Monseigneur, to conduct the happy chocolate to Monseigneur's lips. One lacquey carried the chocolate-pot into the sacred presence; a second, milled and frothed the chocolate with the little instrument he bore for that function; a third, presented the favoured napkin; a fourth (he of the two gold watches), poured the chocolate out. It was impossible for Monseigneur to dispense with one of these attendants on the chocolate and hold his high place under the admiring Heavens. Deep would have been the blot upon his escutcheon if his chocolate had been ignobly waited on by only three men; he must have died of two (Dickens 1859, vii).

Dickens as an English writer would be expected to show little sympathy for Roman Catholic pomp of the era. Britain had long been militantly Protestant, and, in fact, chocolate as a presumed Catholic beverage saw initial suspicion. But the French Revolution put the rest of Europe also in a mood opposed to the old privileges of royalty, both secular and religious. The drink's marbling with aristocratic values saw a growing disdain in favor of the supposed working-class beverages of tea and coffee. Chocolate and its old-style rituals represented not only class-based superiority but also presumed national and cultural superiority, particularly felt in Spain. France from the mid-1600s until the end of the Napoleonic era in 1815 had become the world's most powerful and wealthy country, and so influenced chocolate ritual and consumption as a beverage.

Some research does indicate that French patterns of chocolate consumption even in the 1700s never really moved beyond the aristocracy or elderly. As the strongly secular *philosophes* of the age plotted subversive ideas, they grew to eschew cocoa in favor of coffee. On the other hand, Voltaire still did not like to miss his breakfast chocolate. Some historians contend that growing industrialization of the nineteenth century put the old, languorous morning's chocolate ritual into disfavor. A beverage for snobs, still rather costly. As competing stimulating beverages, Enlightenment values favored coffee or tea (Squicciarini and Swinnen 2016).

Some contemporary sources suggest otherwise, however. In France, *Le Gastronom*e in 1830 observed that chocolate had become so widespread among all classes that “the most modest clerk has something in common with the richest banker in the daily usage of the unctuous ambrosia, nutritious, fortifying and hygienic.” As a “universal cult,” it was noted that chocolate had become a popular gift for the year's end, an exotic substance for young and old, adored by famous gastronome Brillat-Savarin, and even served to accused criminals awaiting execution “to prepare for death” (*Le Gastronom*e 1830, 1–2). And chocolate remained the dominant beverage in Spain and Mesoamerica.

Still, modern times perhaps moved Europe and North America toward a decline of drinking chocolate. But what if it could become eating chocolate? Three revolutions in chocolate preparation from the nineteenth century pulled cocoa back to center stage: cocoa powder, candy bars, and milk chocolate. Van Houten's cocoa press and alkalizing (“Dutching”) process transformed a pasty, greasy cake into a handy powder. The Fry brothers in Bristol, England, experimented with the powder that now had a much lower content of cocoa butter, about 10 to 20 percent instead of about 45 to 55 percent. The Frys added enough of the butter back into the cocoa with a measure of sugar to make a product that could be molded into a neat-looking bar. The century-old dream of chocolatiers, a handy yet palatable eating chocolate, had finally come true! Chocolate bars became a tasty and increasingly inexpensive treat requiring little preparation beyond keeping cool and unwrapping. The new way of chocolate both as an alkalized drink now become easy to prepare, as well as the convenience of a bar were heavily advertised by large industrial makers such as Fry, Rowntree, and Cadbury in England, Menier and Debauxe in France, Van Houten in Holland, Cailler and Suchard in Switzerland, and Walter Baker in North America. But the real explosion in growth came after Daniel Peter, relying on Henri Nestlé's condensed and dried milk, produced the first milk chocolate bar. In 1905, Milton Hershey unwrapped his first five-cent Hershey bar. Chocolate grew to become the everyday treat it is today.

Yet not without considerable resistance from the detractors who continued to suspect that the big industrialized chocolate companies were up to something less salubrious than their advertising suggested. Chocolate, from its inception an exotic import of faraway tropical lands, was precious and pricey. It was also strong tasting, and so it could cover possible off-flavors of extenders and adulterations—even nefarious ones. From nearly the beginning of its use in Mesoamerica, people realized chocolate could be a handy way to mask poison. An early and perhaps most famous story of chocolate as a poison comes from Thomas Gage, a British Dominican friar who in 1648 wrote of his travels to the Maya areas as a

missionary. In Chiapas, he told the story of a bishop who was angry that women were taking chocolate during Catholic Mass. He threatened the offending parishioners with excommunication. As the bishop's enforcers drew swords to keep the women from their chocolate, the offenders "resolved to forsake the cathedral . . . though fairly counseled to obey the command of the Bishop." Suddenly the bishop fell ill. "Physicians were sent for far and near, who all with a joynt opinion agreed that the Bishop was poysoned, and he himself doubted not it at his death." It was a cup of chocolate, Gage noted with irony, "which poisoned him who so rigorously had forbidden chocolate to be drank in the church." Hence, the famous proverb, concluded Gage: "Beware the chocolate of Chiapas" (Gage [1648] 1677, 231–232).

Other well-worn legends of death by chocolate include King Charles II, who in 1675 issued an edict in London closing the coffee and chocolate houses as a bad influence (though the edict was never enforced). His mistress, the duchess of Portsmouth, was supposed to have been the culprit who put poison in the king's chocolate, although historians generally discount the legend (Harwich 1992). Another presumed poisoning through chocolate was aimed toward Pope Clement XIV. Clement had suppressed the chocolate-loving Jesuit order in 1773 and died in 1774. It was generally presumed he was murdered by Jesuit sympathizers who slipped a slow poison into his cup of chocolate (a later medical autopsy disproved that) (Korten 2017). Other stories of poison administered through chocolate include a tale of arsenic that was added to chocolate in a 1735 Boston case, though the family survived, and an effort (unproven) to poison Napoleon through his chocolate. A lurid story told of a Spanish woman seeking her revenge on a cheating lover by luring him to the house and then trapping him with the choice of poisoned chocolate or dagger. He chose the beverage and died within an hour. This story does become less convincing when we recall that the original teller, Madam d'Aulnoy of France, was famous in the 1600s for writing fairy tales. Two sensational Victorian murder trials accused British women of slipping arsenic into chocolate. (Neither woman was convicted, one by reason of insanity.)

One story that seems to check out tells us that Nazis during World War II tried to poison allied officers through chocolate. Perhaps taking a hint, anti-Nazi saboteurs also tried a cocoa ruse by fashioning a chocolate-covered bomb to explode seven seconds after an enthusiastic victim bit off a piece (Prinz 2017).

But the charm of chocolate to the unscrupulous was not so much in its potential to mask poison. It was in its potential to mask pretty much anything. Adulteration of chocolate became a concern even in the eighteenth century. In France before the Revolution, workers' guilds enforced purity, and roving chocolate grinders who worked on site could be monitored. But as chocolate became popular particularly in powder and bar form, the idea of adding elements beyond the typical sugar and spices captured the enthusiasm of nearly all large makers looking to save a bit on the cost of cocoa.

Not all chocolate adulterations were necessarily evil, either in the 1800s or today. J. S. Fry openly marketed a chocolate-arrowroot product designed to reduce the fat. Fry called it "Pearl Cocoa" (Quakers n.d.). Like Fry, Cadbury and many smaller producers typically added starches such as flour. But by the 1850s less

acceptable adulterations were running rampant throughout the industry. Some of those not revealed to customers included replacements for cocoa butter, as it could now be pressed out and sold more profitably to pharmaceutical and cosmetic trades. Additions included lard, mutton suet, or paraffin. Because these have a higher melting point than cocoa butter, however, the pasty, waxy aftertaste easily gave them away. Other popular extenders from the past included ground almonds, chalk, sulphate of lime, ashes, iron oxide, or brick dust—the ochre color possibly used to render the chocolate appearance more appealing. For medicinal purposes, iron, sometimes actual iron filings, was commonly advertised as “ferruginous chocolate” of benefit to tired women (*Le Constitutionnel* 1843). The addition of laudanum also was favored, particularly by the pharmaceutical industry, as it was a commonly prescribed medicine throughout the nineteenth century. With laudanum, a combination of powdered opium dissolved in alcohol, the patient certainly could expect a potent response. But it was bitter. Mixing it with cocoa made it more palatable. (Today laudanum is still prescribed as tincture of opium, mostly for serious diarrhea, as it causes constipation.)

Animal parts also could be curative in medical practice of the past. But perhaps some patients would hesitate at swallowing the prescribed worms, snakes, millipedes, or eel liver (Grivetti and Shapiro 2009). Chocolate could rescue the refused treatment. In case one finds that idea revolting, we do feel obligated to report that today the U.S. Food and Drug Administration allows up to sixty insect fragments per one hundred grams of chocolate, and rodent hair, but no more than one, regardless of fragment size (FDA 2000). But before we toss away our chocolate presumed lightly infested, we need also to recall that most foods we eat contain some level of what the FDA calls “filth.” For chocolate, it is impossible to obtain absolute purity, and some environmentally conscious experts contend that if consumers would tolerate a bit more filth, growers and processors would not need to use as many harmful pesticides.

The nineteenth century’s formal move toward chocolate purity began with a series of reports in the British medical journal *The Lancet* from 1851 to 1854. Arthur Hill Hassall, a physician from the University of London, analyzed a variety of foods including cocoa and chocolate. He concluded regarding cocoa that “eight of the fifty-six samples submitted for examination were genuine.” The rest contained mostly starches, commonly potato flour, wheat flour, arrowroot, sago, and tapioca. “The assertion that starch makes cocoa more ‘digestible’ has no more foundation than that it renders it ‘soluble,’” concluded Hassall. He also noted research had found that chocolate sometimes contained animal fat or vegetable oil, red and yellow ochre (a dye of iron oxide and clay or sand classified today as a hazardous substance), brick dust (similar ingredients to ochre with addition of lime), peroxide of iron, cocoa shells, and tallow. “Even the so-called fine chocolate is made up with clarified mutton-suet and common sugar” (Hassall 1855).

Public consternation over Hassall’s revelations led the British government in 1860 to regulate adulterated products, though the law was seldom enforced. In 1875, punishments increased.

Large chocolate manufacturers, seeing the handwriting on the wall, worked to guarantee the new-found purity of their cocoa products, even if they had been

among the top offenders. Fry and Cadbury as largest producers declared they would remove starches from their products, but Cadbury went further. The company launched an aggressive advertising campaign to declare that theirs was the only “pure” cocoa, while Fry, which had initially defended its addition of starches, was put on the defensive and lost market share to its main rival. The two merged in 1919. British law influenced other purity movements, and by the early twentieth century, the United States and most European countries had enacted pure food and drug laws that included fairly strict regulation of chocolate and cocoa.

Chocolate exploded in popularity between 1850 and the new century, as prices fell, quality became more consistent, and the bar form became more convenient. Easy-to-prepare “Dutched” drinking chocolate also saw renewed favor. A growing temperance movement in Britain and the United States encouraged chocolate as a healthy alternative to strong drink. U.S. cocoa imports also increased as it was a choice of new immigrants from southwestern Europe. France grew to be the world’s top cocoa importer, but Spain retained its traditional lead as highest cocoa consumer per capita. Mexico had never lost its passion for cocoa.

In the United States, a twentieth-century chocolate revolution was launched by Milton Hershey. He promoted his milk chocolate as “nothing more healthful or nourishing” (Lamme and Parcell 2013). Along with U.S. rival Mars, the British giants, and the Swiss manufacturers who had invented it, milk chocolate became an American, British, and Swiss standard exported to much of the world. Dark chocolate, with its slightly bitter flavor, fell out of favor. Chocolate with milk was promoted as a healthy, wholesome product particularly appropriate for mothers and children. Advertising campaigns argued that “leading dieticians” promoted milk for strong bones and energy, and for adults, vitamins and minerals (Frydenborg 2015). Children became so addicted to the “five-cent chocolate bar” that after World War II, when the price went up to eight cents, children across Canada actually staged a chocolate bar strike. They failed to get the price reduced (Clarkson and Daniels 2010).

Concerns over milk chocolate’s purported contribution to tooth decay, its probable contribution to growing obesity, and its vague attachment to an “unhealthy lifestyle” slowed enthusiasm of dieticians, if not children from the 1930s through the 1980s. But in recent decades, new health research and a growing fine-chocolate movement again brought back luster to a food that has seen its fortunes rise and fall over the centuries.

The concern over adulteration in 2021 was not over. While the starches and possible poisons have been regulated out of the product, big chocolate manufacturers still commonly add ingredients to produce a better texture or to stretch the cocoa butter. Soy-based lecithin is often added, usually during a conching process to encourage a smoother and more stable chocolate that mixes better with water. The Fine Chocolate Industry Association contended that as an emulsifier lecithin in mass-market chocolate also allows reduction in more costly cocoa butter. Discerning consumers consider this to be a negative, although research has shown that lecithin poses no negative health consequences. The soy protein content is too small to provoke a reaction to those who are allergic (Giller 2017).

Also commonly added is vanilla, usually as a flavor enhancer. Again, discerning consumers suspect it also is sometimes added to mass-market chocolate in larger quantities to mask poor quality cocoa. Some people caution against buying chocolate with artificial vanillin, though others argue it is hard to tell the difference in taste, noting it has the same components as a real vanilla bean. But it is not a natural product with nuances of the real plant, a native of Mexico.

Purists contend that fine chocolate should contain only sugar, cocoa solids (at least 15 percent), cocoa butter, and dairy (if milk chocolate). Some will allow lecithin and vanilla. But no discerning consumer allows for cocoa butter equivalents (CBEs). It was just this that launched the European chocolate war of 1973.

European consumers like those in the United States have evolved to prefer different chocolate flavors depending on their country's traditions. In Britain, Ireland, and Denmark, manufacturers normally added a small percentage of CBEs—to give the product the taste consumers expected, along with more milk and less cocoa mass. Normally, the CBE was vegetable fat. However, economic integration of the European Union (EU) required common regulations. Most Continental chocolate manufacturers followed rules prohibiting CBEs in a confectionary called chocolate. The European Economic Community began by decreeing that Britain, Ireland, and Denmark could not market their confections on the Continent as chocolate. In the 1980s, new members changed the weight of opinion, and so the final decision at the turn of the millennium allowed a maximum of 5 percent CBEs in dark chocolate, 20 percent in milk chocolate, but only if labeled “family milk chocolate” (EU 2000; Squicciarini and Swinnen 2016).

The slight flexibility in ingredients does not extend to the United States. While in 2007 the Chocolate Manufacturers Association asked the FDA to allow CBEs in chocolate, public opinion persuaded the agency to refuse. The FDA's voluminous regulations on chocolate include a requirement that milk chocolate contain at least 10 percent chocolate liquor (chocolate mass is called chocolate liquor in the United States). Less than that, or with added CBEs, it can only be called “chocolatey” (Registrar Corporation 2015). The FDA offers no official definition for dark chocolate, but most critics contend it should include at least 40 percent cocoa (cocoa solids and cocoa butter). Good milk chocolate should include 45 percent cocoa. But a higher percentage does not necessarily mean a better chocolate. Many people do not prefer the strong taste of some dark chocolate above about 70 percent.

What, in fact, does that percentage indicated on some dark chocolate bar labels mean? Not 70 percent cocoa mass, actually. It means the amount of cocoa mass plus the amount of added cocoa butter. The Fry brothers made the first bar chocolate by adding cocoa butter back into the mass. It still may be done that way. A 70 percent bar may be mostly mass and a little cocoa butter, or may be one-half the mass and a lot more cocoa butter. A high cocoa butter content is not necessarily bad, and it often is used for a more smoothly flowing *couverture*, the chocolate used to enrobe pastries or candies. “Baking chocolate” normally contains no sugar, as it is presumed cooks will add that along with flour and fats. It normally is not conched and so a bit gritty and may rely on lower quality cocoa (Gordon 2007).

“White chocolate,” that is, a confection made with cocoa butter, milk, and sugar, but no cocoa solids, does not taste like chocolate. It could not be labeled as such in the United States until 2002. After a petition by Hershey and the Chocolate Manufacturers Association, the agency agreed to allow the labeling of “white chocolate” if it contained at least 20 percent cocoa butter.

By 2021, the last word on CBEs had not been spoken, as feared shortages of cocoa are encouraging producers to consider other extenders for cocoa butter. Palm oil is one common choice, but shea butter is considered a superior equivalent. It increases chocolate’s melting point, adding to its stability in warm climates, and tasters have been unable to tell the difference in products substituting some shea butter for cocoa butter. A possible challenge is that people associate shea butter with cosmetics, though most of it actually is used in candy. Regulation varies and will change. Cocoa is a volatile industry buffeted by production in sometimes unstable nations, huge price fluctuations for the raw product, control by multinational conglomerates, and changing tastes based on historical patterns of consumption and contemporary preferences.

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Processing Cacao

Slice open a fresh ripe cacao pod and you will discover a pasty white pulp surrounding neat rows of fig-sized seeds. The pulp tastes sweet—a nice snack for cacao workers, and possibly a good drink for later, with or without fermentation to add an alcoholic kick. The seeds? Well, there is no obvious reason the bitter things should be any more useful than seeds of cucumber or watermelon that we throw out. And so probably South American natives did throw them out millennia ago. Perhaps they threw some old ones into the fire. Perhaps they noticed something—what was that appealing smell? Perhaps they pulled them out of the fire, peeled the brittle shell, and gave them a chew.

We can only guess how ancient Americans discovered chocolate. We do surmise that cacao was used in some way up to 5,500 years ago, as archeologists have discovered in Ecuador ceramic pots and a piece of mortar with traces of cacao-marker theobromine (Waxman 2017). The chocolate taste turned out to be like no other taste on earth. A lot of fruits have a citrus flavor. Several types of salad greens have a similar texture and slight bitterness. People say many kinds of meat “taste like chicken.” But nothing tastes like chocolate. Perhaps some argue for carob, a Mediterranean shrub producing a pod that, roasted, reminds some people of chocolate (but vaguely). It is sold as a chocolate alternative primarily because it does not contain a stimulant as chocolate does (theobromine mostly, a little caffeine).

But a potential for that wonderful chocolate flavor is in no way obvious looking at the pod or the seed. From the very beginning, cacao seeds must undergo a number of processing steps from tree to bar or beverage. Required steps have not changed since ancient times, although nowadays machines do the hardest jobs. Processors have added a few steps not required, but helpful.

Before the machine age of the late 1700s, producing chocolate was an onerous task. After fermenting the seeds, often under banana leaves, the resulting beans were dried and roasted.

The now brownish almond-shaped brittle beans were stored for shipment or were cracked into nibs and the shells usually winnowed away. Then the nibs were

ground. As cacao beans are fatty, about 50 percent cacao butter, with a little heat they grind to a gritty paste we call chocolate liquor or chocolate mass. Spanish colonists discovered native people, usually women, doing the tedious work over a heated, curved stone slab called a *metate* to crush the hard nibs as finely as possible. These would be fashioned into cakes or tablets and stored. The native routine of preparation was invariably done the same way, an approach that perhaps can be compared to the famous tea ritual of Japan.

Natives made the final chocolate drink, always a beverage, usually by adding a variety of spices with water. The somewhat bitter chocolate was not usually sweetened, as the beverage was considered a ritual for religion or health, and not as a treat. While it is true that sugar was unknown to pre-Columbian Central America, it is not true that chocolate was never sweetened; occasionally honey was added. Spanish physician Bernardino de Sahagún in the 1500s described a “honeyed chocolate made with ground up dried flowers” (Norton 2006). But that was apparently uncommon, as most early Spanish describing the native beverage noted its bitterness and did not report sweeteners among the many spices that could be added.

Other spices nearly always part of the native beverages included chili peppers, vanilla, often maize, and annatto, a dye from the achiote tree that colors bright orange to red. Spanish historian Oviedo observed that the commonly added annatto turned lips and beards red, something he found unappealing (Coe and Coe 1996). But chocolate in native ritual often symbolized blood.

A challenge for centuries to chocolate as a more appealing beverage was the cocoa butter. The mostly stearic acid-based fat has throughout history symbolized both the greatest glory and greatest challenge of cocoa. As one of two clearly separate substances in chocolate, European doctors who practiced humoral medicine over two centuries of debate were stymied by the combination of the apparently warm and moist fat with a cool and dry astringency of the cocoa solids. On a more practical basis, beverages made with ground chocolate formed a thin drink with an unappealing greasy layer at the top. It was hard to encourage the oily cocoa butter to mix in a water-based drink. Traditional natives responded by pouring chocolate from a cup-shaped gourd to gourd or other container. The vigorous pouring from containers held at a distance served to help mix the butter and, as added benefit, built a froth particularly esteemed among native chocolate consumers. The first Spanish disdained the brownish foam. Juan de Cárdenas, an early physician who traveled to the New World, said it was nothing but air that would cause flatulence (Presilla 2009). The Maya who loved the foam called it “yom cacao” and to pour from one vessel to another at great height, “t’oh haa” (Giller 2017). But like many native preparations, the frothy cocoa beverage grew to be an attraction in the Old World as well.

One could also scrape the fat that floated to the surface of the beverage. But the Spanish found their own way to deal with the greasy layer while building the froth: the *molinillo* (*molinet* in French). The idea of a sort of large frothing stick was first thought to have been a pre-Columbian invention. But more careful research showed no evidence that the Aztecs or Maya used such a device, first described by the Spanish. It was, however, invented in Mexico, after it became a

Spanish colony, and exported to Europe. The *molinillo* was paired with a clay, ceramic, or metal pot with a hole in the lid for the stick. After pouring the chocolate into the pot, the handle would be swirled between the hands to create froth and help emulsify the cocoa butter. By the end of the 1600s, fine silver or porcelain *chocolatières* had become an elegant part of many upper-class European or colonial American households. They died out with the invention of the alkalizing process in the early nineteenth century, although sometimes are still found in the markets of rural Mexico.

The froth and many of the traditional spices of the New World became Spanish standards as the process of turning dry bean into a palatable beverage moved to Europe and the American colonies. But movement was slow, surprisingly so. While becoming popular in the colonies of New Spain, we have little evidence for popularity in the Old World until nearly a century after Columbus first spied the odd almond-shaped beans in 1502 in Guanaja (Dillinger et al. 2000).

The first recorded shipment, to Seville, dates from 1585, though it probably had become familiar in monasteries before this time (Frydenborg 2015; Coe and Coe 1996). By 1620, however, thousands of kilos were reaching Spain. Antonio Colmenero de Ledesma's benchmark 1631 text was far from the first Spanish treatise on chocolate. But new foods, like new ideas, are often slow to catch on. The chocolate sled moved slowly up the hill until it reached the top—and then it took off. Colmenero's small chocolate monograph became a bestseller in a Europe that was primed for the exotic beverage from afar. By the end of the century, the upper class would be expected to serve the drink in complete and ornate chocolate sets, with their own European rituals of preparation and service. Chocolate houses became part of all major European cities, along with the growing popularity of the two other new stimulating beverages from afar that arrived a bit later, coffee and tea.

European chocolate preparation differed from Aztec and Maya most obviously in the invariable addition of sugar and elimination of some spices many Europeans found distasteful. It is uncertain, however, whether the most obvious addition, sugar, was favored because it tamed chocolate's bitterness or because it provided more quick energy that became a common reason some people favored the beverage. Certainly, the Spanish, in particular, tried to recreate what they grew to like in native chocolate: the froth, the pepper, the vanilla, and even the reddish tinge of annatto. But the original Spanish recipes evolved, particularly in other parts of Europe and America, to a beverage most likely to contain at its base sugar and vanilla, both New World substances. Other additions were considered as needed to treat specific illnesses, as chocolate from its inception was consumed as food for health.

What did not change was the need to process the bean, nearly inedible as it arrived from tropical lands. Cocoa beans were nearly invariably shipped to Europe and the American colonies whole and unroasted. They had been fermented and dried, as they must be, but the continued processes that turned a dry bean with no particular aroma into a tasty "medicine" became part of European and American custom, first on a small scale and later on a huge industrial one. Early Spanish turned to a process in which beans were roasted on a shovel held over a fire,

avoiding the smoke that would transfer its taste. Beans were then spread out, crumbled with iron rolling pins, winnowed to extract the nibs (broken beans) from shells, and roasted again to enhance flavor (Grivetti and Shapiro 2009).

Shells were saved to produce a separate beverage. Cocoa shell tea became surprisingly popular in colonial America; Martha Washington supposedly was an aficionado of the stimulating coffee-like beverage. But relatively uncontrolled roasting of beans is tricky. Underroasted, they did not surrender their harsh bitter flavor, but overroasted, they tasted burnt. Even today, we can buy unroasted beans online and roast them ourselves in a frying pan that might be a bit like the Spanish shovel. It is, however, a challenge to obtain a uniform and acceptable roast by this method.

The broken nibs would be ground finer using a mortar and pestle, then transferred to a heated stone *metate*. The heat and further grinding turned the fat-rich nibs into the paste, the cocoa liquor or cocoa mass. Henry Stubbe, physician to English king Charles II and author of an early chocolate treatise, had observed the process in Jamaica. Referring to Colmenero and the Spanish as the recognized experts, he wrote in 1662 that the ground nibs are formed into “cakes, lumps, rous, lozenges, or enclosed in boxes,” and then when ready to be used, dissolved in water, usually after another grinding process to produce powder (Stubbe 1662).

Early Old World chocolate preparation invariably called for additions of sugar and a variety of spices. Sugar, vanilla, and cinnamon as most common were often added during the final grinding for best mixing. Additions, however, were sometimes added by the consumer or the chocolate house. Stubbe declared that added Jamaican pepper could improve menstrual and urine flow, sharpen the brain, and discourage flatulence. Vanilla could strengthen the heart. Chocolate houses often developed their signature recipes; Stubbe during his time in Jamaica had seen preparations in which milk was added to tame the bitterness. As Jamaica was captured by the British in 1655, the custom apparently was brought back to England. Stubbe noted that in London, commercial preparations with the addition of milk or eggs became popular, although the proprietors may have encouraged this recipe more as a way to save on the more expensive chocolate than to tame the bitterness. Recipes from king and court do not mention these additions (Loveman 2013). More popular into the nineteenth century were the additions of the typical vanilla, sugar, and annatto, as well as coconut, anise, cardamom, cloves, nutmeg, almonds, sugar in rose water, musk, and ambergris. Uncommon as foods today, musk is a glandular secretion from the musk deer. Ambergris is produced by the digestive system of sperm whales. Diderot’s eighteenth-century encyclopedia suggested ambergris was common in “superb chocolate” (Grivetti and Shapiro 2009).

The steps from bean to beverage, as one can imagine, were tedious when done by hand, and so the work often was relegated to household servants or slaves. But as chocolate became generally familiar among the more affluent in the 1700s, entrepreneurs made efforts to set up commercial production. In colonial Boston, chocolate became an apothecary’s product advertised as early as 1712 (Coe and Coe 1996). These precursors of today’s pharmacists became obvious early sources for chocolate, not only because it was considered a health food and medicine but also because it could be mixed with other medicines to mask unpalatable flavors.

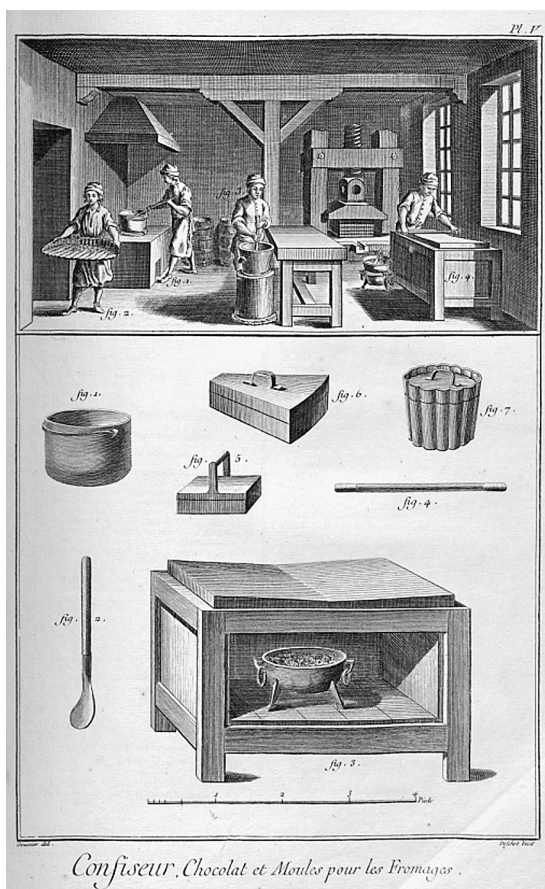
Moreover, apothecaries were familiar with grinding medications and had the tools for it. Pharmacists were common sources for chocolate until the end of the 1800s—and we know today that most retail pharmacies still include a rack of candy bars.

But a larger scale production of chocolate became an attraction later in the century as sellers realized they could profit from centralizing and streamlining a tiresome process. In 1728, Walter Churchman built a mill relying on water power to turn a grinding stone. It was eventually purchased by famous English apothecary-cum-confectioner Joseph Fry. Many more roasting and grinding operations had been set up by the mid-eighteenth century. The most famous American one that survives today dates from 1765 in colonial Massachusetts. James Baker and John Hannon operated a mill to grind imported beans. Baker soon assumed control of the operation, and his chocolate grew to become the dominant brand in North America throughout the nineteenth century. Today Baker's Chocolate survives as one of the oldest brands in the United States (though it has become part of the Kraft-Heinz food conglomerate). Large chocolate mills by the early nineteenth century grew to dominate the roasting and grinding processes. The final cakes of chocolate were stamped with a maker's name to suggest quality, then wrapped and shipped in wooden boxes. But cocoa easily picks up off flavors, even the pine of the boxes. And the roasting process is critical to cacao flavor. Product quality was still uneven, but discerning customers would search for chocolate from highly prized origins. The highest quality was from Soconusco, the ancient source of Aztec chocolate, although as production there dwindled, "Caracas" beans from Venezuela (*Caraque* in French, *Carack* in English) became favored. Guayaquil beans from Ecuador were considered to be lower quality (Presilla 2009).

The nibs, in botanical terms called cotyledons, must be roasted not only to develop flavor but also to sterilize against harmful bacteria such as salmonella. Length of roasting, style, and temperature can have a huge impact on final chocolate taste. Many manufacturers keep their roasting processes secret. From shovels over a fire, roasting by the 1700s became more efficient, often done by tumbling the beans in a basket over heat for uniform roast. Times varied from about one to two hours, at about 100°C. Generally today, European manufacturers roast longer and at a lower temperature. They contend that this produces a deeper chocolate flavor and requires less sugar to mellow it, than the shorter and higher temperatures of many U.S. roasters (Gordon 2007; Bloom 1998). But chocolate preference among everyday consumers seems to be based more on childhood familiarity than on taste alone.

Factory roasting became standard by the turn of the eighteenth century, along with large-scale factory grinding. In 1795, Joseph Fry in Bristol launched an industrial revolution in chocolate manufacture by putting to use James Watt's new steam engines to grind cocoa beans. Small-scale preparation ebbed through the next two centuries until it remained only in a few traditional sites in Mesoamerica—before the bean-to-bar movement grew in the late 1990s.

While chocolate could now be produced at a scale far beyond the efforts of homemakers and servants, the product itself had not changed much. Output still was a somewhat gritty, pasty bar nearly always mixed with water and consumed as a drink. For quick energy, the bar itself could be eaten—Stubbe suggested the



By the mid-1700s small-scale chocolate manufacturing had replaced some of the tedious home-based preparation. Diderot's *Encyclopédie* (1751–1772) illustrates workers who clean, crush, roast, and grind the beans. Equipment depicted include the heated cocoa nib grinding table. Figures 5, 6, and 7 are cheese molds. (Diderot, M. *Encyclopedie ou Dictionnaire Raisonne des Sciences...* Paris: de l'Academie Royale des Sciences, 1751.)

make chocolate easier to prepare and more attractive to drink. The first echoed an idea actually tried by the Aztecs, who hoped to reduce the naturally high acidity of cocoa by mixing wood ashes into the chocolate (Grivetti and Shapiro 2009). Van Houten probably had not heard of that effort to raise chocolate's pH, but reasoned that adding an alkali to chocolate could not only make it easier to disperse in water or milk but also could attenuate the lingering natural bitterness and even produce a darker and more attractive-looking cocoa. He treated cocoa with alkaline salts to reduce its acidity from the typical pH of about 5–6 (Moser 2015). The milder, darker, more pleasant-appearing beverage would appeal to a growing middle class. The idea that darker cocoa would be milder seemed counterintuitive, but heavily

possibility—but it was not very palatable, so hardly ever was. As a liquid, it became quite appealing for taste. It was not so appealing for appearance. Cocoa butter floated unpleasantly to the top. It could be scraped away, whisked, or frothed with a *molinillo* to blend. The grittiness, however, remained, both by the cocoa granules and sugar that could not be hand-ground fine enough to render them undetectable. As the Industrial Revolution turned formerly agrarian cultures into powerhouses of steam and machine, chocolate, by now an old familiar drink, lost popularity. Coffee and, especially in Britain, tea replaced it as favorite stimulating beverage. Chocolate became a rather costly elitist drink with a Catholic connection or perhaps a beverage for old people, though it was always avidly consumed in Spain and Mexico. It was a chore to prepare, had an unattractive grittiness, and was fatty and fattening.

An invention credited to a Dutch inventor would transform the industry. Coenraad Van Houten (or probably his father, Caspardus) in 1828 patented processes that he believed would

“Dutched” cocoa with a pH of about 8 turns nearly black. It is what we recognize today in familiar Oreo brand cookies.

The alkalizing, or “Dutch process,” was twinned with a second van Houten patent that responded to another complaint against chocolate—it was laden with fat, up to 56 percent. Van Houten (probably Caspardus) set up a hydraulic press to force the cocoa butter out of the cocoa liquor. Cocoa butter was pressed out through a mesh, leaving a cake of about 10–22 percent fat. The cake could be ground to powder and, treated with the alkali (either before or after pressing), would leave an easy-mixing cocoa. No more *molinillo*! Old-style chocolate pots soon became obsolete. But, of course, no more foam, either. You could add marshmallows—after a manufacturing process made them common beginning in 1900.

Cocoa butter generally today is more valuable than cocoa solids for a variety of purposes. As a vegetable fat it does not easily turn rancid, and it is solid at room temperature. Unusually, however, it melts at just below body temperature. This characteristic is critical to a product that Van Houten apparently did not consider making himself. But chocolatier Joseph Fry’s grandson did.

Van Houten’s pressed and Dutched cocoa powder—possibly he even popularized the term “cocoa”—could not only make a drink tastier to a modern palate and simpler to make. It could also be used in some ice cream or in baked goods in which the preparer did not want a reaction of the acidic cocoa and other ingredients. There was something else about the new product that would produce the single greatest revolution in five centuries of cacao.

J. S. Fry & Sons by the nineteenth century was becoming Britain’s largest manufacturer of chocolate. Fry wondered about the possibility of actually returning some of the cocoa butter pressed out by Van Houten’s machine to produce something better than the old dry, brittle cake that centuries of consumers had called “chocolate.” Fry developed a mixture of cocoa powder, sugar, and melted cocoa butter to produce a viscous liquid that could be cast into a mold. In 1847, Fry produced the first modern bar of chocolate. It was introduced to an avid public two years later in Birmingham, England. From something people could only drink Fry offered something people could eat, a quick snack. To create a palatable and stable bar of chocolate had been for centuries a dream of manufacturers. Now people could carry their chocolate anywhere, and as the Industrial Revolution created a workforce that commuted daily on public transportation, demand soared at rail stations and shops. Fry became the world’s largest chocolate company. Chocolate now could be molded into bars, and then into shapes, and soon one could buy chocolate as balls, pastilles, pralines, batons, tablets, fruits, houses, furniture, bunnies, and Napoleon Bonaparte in relief (*Le Gastronom* 1830). While molded chocolate predated Fry’s bar, it now became easier to make, cheaper to market, and neater to eat.

A problem remained: it was a bit gritty. This was not necessarily bad, and it was impossible for early mills to grind the nib fine enough to produce a smooth product. A substance will feel gritty on the tongue if particles are larger than about 30 microns (Loiza Dark n.d.). Both cocoa particles and sugar particles are difficult to grind fine enough by hand to avoid the gritty feel. But industrial manufacturing in the nineteenth century finally addressed this issue with a new kind of

grinder, the *melangeur*. Philippe Suchard, who in 1826 established an industrial chocolate operation in Switzerland, invented a machine using granite rollers revolving over a slab to break the particles into an ever-finer size until they reached the goal of less than 30 microns. Today most manufacturers aim at a size of 20 microns or less using a modern version of the *melangeur* featuring multiple steel rollers like a printing press, moving the chocolate liquor through smaller and smaller passages until a dry powder emerges (Gordon 2007).

Huge chocolate manufacturers grew to compete with Fry and advertised extensively in the burgeoning printed mass media of the time. Cocoa, now served more commonly as a confection than a drink, took off after mid-century to become one of the world's largest industries. But success came at a price for those who preferred the traditional high-quality chocolate of the past: it was becoming harder and harder to find.

A growing preference for a milder chocolate, preferably in solid form, encouraged research into an old recipe that people liked, but was difficult to make, milk chocolate. Chocolate had always been sometimes mixed with milk. It produced an appealing thicker beverage than the usual water-based recipe. But milk in an age before pasteurization and refrigeration easily spoiled. It could only be added at the moment of preparation. Powdered cocoa and chocolate bars made possible by inventions of the early nineteenth century could still not be offered with milk. Not only would the product be unstable, but it would not harden properly, as addition of water spoils chocolate's consistency. Milk is 87 percent water. Somehow manufacturers needed to find a way to remove the water but preserve the milk solids. It took nearly a half century after Van Houten to find the answer.

Pharmacist's assistant Henri Nestlé of Vevey, Switzerland, in the mid-nineteenth century was considering profitable uses for the milk of abundant cows that grazed the mountainous nation. His first effort, a condensed-milk cereal for infants, grew popular in Europe and elsewhere in the world. Nestlé sold his company in 1875. But that is hardly the end of the story. His product would turn out to have a worldwide impact far beyond the baby food.

Nestlé's neighbor in Vevey, Daniel Peter, was attempting to find a way to add milk to chocolate without the usual inferior result. As son-in-law of François-Louis Cailler, one of Switzerland's oldest chocolate manufacturers, Peter applied his chocolate curiosity to the problem of how to combine two Swiss products—chocolate and milk. Nestlé offered to help with an idea based on his infant formula using dried (or possibly condensed, or condensed and dried) milk. The water content that spoiled the chocolate was eliminated. Milk-based powder was mixed with cocoa solids and sugar. It could now be heated and poured into molds, and in 1879 Peter unveiled the first bar of milk chocolate. The twentieth-century chocolate boom had been ignited. Most consumers came to prefer the milder and usually sweeter taste of milk chocolate, both in bar and beverage. Chocolate's characteristic slightly bitter taste was nearly gone, and the creamier quality of milk chocolate appealed particularly to children. Large manufacturers began to care less about the quality of the cocoa and more about the composition of the milk powder. As milk was cheaper than cocoa in Europe and the United States, bars could be produced at a price that made chocolate accessible to everybody.

Industrial chocolate manufacturer Cadbury in Britain unveiled its iconic Dairy Milk bar in 1905. It soon became the company's most important product. Hershey began a little earlier, introducing its milk chocolate bar in 1900. It became an American icon (Lamme and Parcell 2013).

But early manufacturers of milk chocolate bars still had a problem, actually two problems. One, the texture was still slightly gritty. Two, the bar could take on an unappealing whitish sheen and flaccid snap. Contributions of the Swiss to modern chocolate had not come to an end. In 1880, Rodolphe Lindt, a pharmacist's son from Berne, apparently noticed that chocolate left unusually long in a grinding machine seemed to take on a more appealing texture and taste. He tried remaking the standard grinder by adding a granite trough that curved inward like a shell that he thought resembled a conch. A mechanical roller continually refolded the chocolate to drive out water and aerate the mixture so that it flowed more easily. This not only produced a smoother chocolate. It also produced a tastier product by driving away some of the sour and bitter notes. Particle clumps were broken and coated more efficiently with fat to produce a smoother, less astringent product. The process was time-consuming—*conching*, as Lindt called it, took up to three days of mechanically working the chocolate mass.

Lindt's conching process became the most coveted secret among chocolate manufacturers at the turn of the last century. When Milton Hershey moved from caramel to milk chocolate production, he tried to recreate the Swiss flavor by guess. His milk chocolate quickly turned rancid. But with the help of employee John Schmalbach, Hershey managed to use an evaporated milk product and his own method that worked, although it had a bit of a sour taste that did not match the Swiss product. Nevertheless, Hershey's five-cent bar of milk chocolate won over Americans who actually grew to prefer the taste (Frydenborg 2015). Europeans disdained the Hershey bar; still today European chocolate is manufactured for a different palate than the U.S. versions. By the 1920s, few consumers still wanted the old-style "crunchy" chocolate. Conching had come the industry standard.

Lindt gave up his conching secret after two decades and sold out to Rudolf Sprüngli. Lindt and Sprüngli today has survived to become one of the world's largest chocolate companies. More than many other companies, its products still feature the conching process that built its fame. Other companies often conch for a shorter period (as time is money) or rely on modern grinders to produce a particle size far smaller than the old grinders could manage.

But what about the second problem? While conching produced a more stable product, it did not produce a chocolate bar that resisted "fat bloom," an unappealing whitish coating that may appear on a bar after storage. What is more, it did not have a satisfying snap of quality chocolate. Swiss chocolate ingenuity also solved this. The answer was tempering.

Chocolate mass does not harden by "drying," that is, by losing water. It contains no water. Instead, it hardens by crystallization of the cocoa butter. The idea of tempering begins with molten chocolate, in which six types of fat crystals melt. It is heated and cooled under control, and seeded with crystal Type V to encourage the crystals to set in a specific pattern. The Type V crystal must be aligned to give chocolate its attractive shiny appearance, satisfying snap, and resistance to bloom.

Untempered chocolate is also more difficult to remove from molds, as it does not shrink (Beckett 2000).

While tempered chocolate resists fat bloom, we may nevertheless see the dusty whitish coating in a poorly tempered bar or one that has been stored at uneven temperatures. This is unattractive, but it can be saved by retempering. If, however, the whitish bloom is caused by moisture that clumps the sugar crystals and floats them to the surface (usually after condensation from refrigeration), it cannot be saved. Both are still edible, though not a delightful chocolate experience.

Modern chocolate now was ready for the explosion of popularity in the twentieth century. By the 1920s, the word “chocolate” itself meant “milk chocolate” to most people, and it usually came to retail shelves from huge industrial confectioners. A few additions to the original chocolate mass, sugar and milk, have become nearly ubiquitous in today’s mass-produced chocolate. Soy-based lecithin is an emulsifier that helps chocolate dissolve more easily in drinks and makes it easier for chocolatiers and manufacturers to work. It may allow a producer to use a lower amount of the more costly cocoa butter. Cocoa butter is popular for cosmetics and medicines or can be used to make its own product, called white chocolate. The age-old addition of vanilla is still popular to enhance taste and, possibly, to disguise faults in low-quality cocoa. Some chocolate lovers say the taste of the cheaper artificial vanillin is unpleasant and should be avoided. Some mass-produced chocolate makers substitute cheaper fat for cacao butter, commonly milk fat, partially hydrogenated vegetable oil, coconut oil, or palm oil. These cocoa butter equivalents (CBEs) have become highly controversial, and most chocolate connoisseurs suggest they be avoided.

The growth of small “bean-to-bar” chocolate producers since the 1990s have encouraged renewed interest in fine-quality, single-origin chocolate that had been generally lost with the domination of a mass-produced industrial product. Small operations used to require a fairly high initial investment, primarily due to the cost of the grinding melangeur, about \$70,000. However, in the early twenty-first century, John Nanci’s small melangeur brought professional grinding down to a reasonable price. In 2019, it listed at \$479, using a traditional granite plate, grinding to between 10 and 20 microns (Nanci 2016). Home kitchen-centered hobbyists can buy a juicer to produce the chocolate mass and can buy unroasted fermented beans online. More serious bean-to-bar operations have sprung up around the world to challenge the big candy manufacturers by producing high-quality chocolate that had been nearly unobtainable for more than a century.

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Chocolate for Profit

The Business of Cacao

A worldwide chocolate industry has for centuries rested on one simple accident of geography. Cacao can only be grown in a band circling the equator, from 20° N to 20° S. It is the same region most of Europe colonized from the 1500s through the 1800s. It is the same region from which Europe pulled some 12.5 million slaves over 350 years. And profit in the cocoa sector has always rested on the labor of native populations living in this band in the Western Hemisphere, enslaved, coerced, or underpaid. In 2021, it was still the case that impoverished and sometimes coerced labor contributed to cacao production.

Colonial systems resting on mercantile economics dictated the original approach Europeans took to the business of chocolate. Columbus and those who came after brought the power of the military, the aggressiveness of Christian missionaries, and the avarice of European monarchs and merchants hoping to expand trade to reap great profit. Today many people admire the early European explorers for their bravery and quest for learning, and certainly they displayed those virtues. But simple exploration of the unknown world was not the only reason—in fact, not the main reason—investors backed voyages of exploration. Explorers focused on a central mission: how a new world could make them rich. The development of Europe's mercantile capitalism rested on trade in commodities, and central to that was development of trade in cacao, along with sugar and other new and exotic foods (Mcanany and Murata 2007).

The point of establishing colonies, believed Europe's colonial conquerors, was to enrich the governments, colonial overlords, and financial backers. The goal, then, was to find potential riches of the New World that could be cheaply gathered and shipped home to enrich commercial and political interests.

Early Spanish explorers to Mesoamerica began their search with the obvious source of instant riches: gold and silver. But almost at the beginning of the conquest era, Hernán Cortés realized riches of the New World could extend beyond the obvious. It could also flow from a product rare and unobtainable in Europe, but held in high esteem among Indigenous peoples. That product was cocoa.

The idea that cocoa beans could mean wealth occurred to explorers even with the voyages of Columbus. The famous explorer, who certainly was not above finding ways to make a peso or two, discovered cocoa beans in 1502 on his last voyage to the New World. Encountering the beans in a native trading boat at Guanaja, an island off Honduras, wrote his son Ferdinand, Columbus presumed that they were a type of almond. But apparently a strange and precious variety, as Ferdinand reported the natives held them in such regard that they scooped to pick them up as if they were coins. Some historians extrapolate from this that Columbus tried chocolate or took the beans back to Spain. Historians can find no evidence of that, however, nor of a presumption that the explorer saw possibilities of wealth in mere beans. But clearly the explorers did take notice.

A few years later, Cortés and his soldiers observed Mesoamerican natives so highly taken with cocoa that they in fact did use the beans for money. The Aztec rulers demanded beans as tribute from conquered peoples in southern Mexico where the cacao trees grew. Money that grew on trees ought to be grown on my trees, Cortés apparently reasoned. After conquering the Aztec Empire in 1519, Cortés immediately sent a letter to Charles V, king of Spain, explaining that he had acquired a plantation on the Pacific Coast nurturing two thousand cacao trees (Presilla 2009). The conquistador almost certainly became the first European who set up to enrich himself by trading in cacao, at this point of value only within Mesoamerica.

As more colonists saw the wealth that could flow from the cocoa bean, the Spanish conquerors assumed control of the old Aztec tribute system, including a maze of trails between Soconusco, in modern Chiapas, and the capital used to transfer *cargas* of cocoa. By 1548, the required tribute to Spanish rulers was 200 *cargas*, a Spanish measure (one *carga* was 24,000 cocoa beans). The Spanish Crown required more and more wealth for its wars and sought to obtain it through its colonial operations. By 1571, the required cocoa bean tribute increased to 400–600 *cargas*, by 1576 to 650, and, by 1613, to 1,133 *cargas*. By the late 1500s, this production required an estimated 1.5 million cacao trees (McNeil 2006; Forrest and Najjaj 2007). Merchants and Catholic religious orders established cacao operations in an attempt to snare some of the riches.

Nearly a century after Cortés, Spain and Portugal had grown an appetite for chocolate. Its use was spreading to Italy and soon would enchant the rest of Europe. Spanish merchants, the monarchy, and religious orders by the early 1600s apparently required production reaching an astounding level of more than 27 million beans. Soconusco production could not keep up. Overwork, wars, and violence had destroyed up to 95 percent of the native population by 1600. Colonizers turned to Guatemala and other traditional sources, but there too a decimated population of coerced native labor could not produce enough of the profitable beans for European requirements (Norton 2006; McNeil 2006). The main source of cocoa became South America, and the main source of labor became African slaves.

Conquistadors beginning with Francisco Pizarro roamed South America in an attempt to seek out riches; they noticed cacao trees growing wild around the Guayaquil coast of Ecuador. These, however, appeared different from those grown

in Soconusco and Guatemala. Colonists called this variety “forastero,” that is, foreign, and while modern research has shown “forastero” actually is not a single variety, the name has stuck over centuries. Early settlers believed the variety tasted more bitter and so was not as high quality as the familiar “criollo” of Mesoamerica, but it did not stop them from cultivating the beans as Central American production fell. Appropriating large tracts of native land claimed by the Spanish Crown, conquistadors, religious orders, and colonial officials established plantations as a way of profit from cacao and other tropically grown commodities, notably sugar. Sugar and cacao were closely linked. Their production in the New World could be highly profitable in the Old World. Sugar was necessary for cocoa because its addition was required to make cocoa acceptable to a European palate. Again, colonial authorities relied on native labor, often compelled, sometimes enslaved (Frydenborg 2015; Walker 2007).

The Catholic Jesuit Order had expanded its lucrative cocoa production from Soconusco to Paraguay, and then to the upper Amazon of Brazil. In the Amazon rainforests, the cacao tree also grew wild; all the Jesuits had to do was harvest and transport the beans. That became a challenge, however, as natives employed or sometimes coerced to harvest could easily run away to the forest—or die, as South America’s native population also perished nearly in its entirety after conquest (Walker 2007). Cacao harvest was moved to Bahia, in the Portuguese colony of Brazil, where a lucrative trade could be maintained by relying on slave labor. Slaves had arrived there as early as 1538 and were already working the sugar plantations when the viceroy asked the Jesuit order to establish cacao plantations in the capital in 1664. Salvador de Bahia, the colonial capital under Portuguese rule, became one of the wealthiest cities in the Americas and also probably its top importer of African slaves. An estimated 3.5 million to 5 million slaves went through the port in the 250 years before slave imports were banned; in addition to sugar and tobacco, most enslaved Africans who stayed in the Bahia region went to work in the cacao plantations. A soaring growth in Brazilian cocoa rested on the free labor of enslaved Africans, propelling the capital to become one of the wealthiest cities in the Americas. Rival Spain tried to corner the cocoa market with its exports from Venezuela but was unsuccessful (Walker 2007; Presilla 2009).

In Europe and the North American colonies, chocolate service grew slowly, as the beverage was still little known before the mid-1600s. But as drinking chocolate became a new fad of wealthier Europeans, chocolate and coffee shops (which usually also served chocolate) sprang up in London, the American colonies, and the European Continent. Based on an advertisement, historians believe London’s first chocolate service opened in 1657. The first service in Paris opened about 1669, based on evidence of an early newspaper report, though likely chocolate was served earlier (*Mercure de France* 1736). Chocolate shops in Venice opened a bit earlier, based on an apparent first introduction to the beverage outside of Iberia, to Italy. Coffee also was served, popular at one-third the price of chocolate. Café Florian in Venice opened in 1720 and by 1760 gleaned much of its profits by selling chocolate (Korten 2017). The famous café in 2021 was still in business.

In addition to café and chocolate shop proprietors, china and glassmakers profited from the growing craze by offering chocolate sets. Some were plain, others

ornate, and the earlier ones (before 1800s) featured a center hole for the stirring stick or *molinillo*. Affluent homes in Europe and the North American colonies by the 1700s usually had their own chocolate set and possibly chocolate kitchens staffed by servants or slaves to do the tedious process of roasting and grinding (Grivetti and Shapiro 2009; Reynolds 2019).

European and North American business people realized, however, that profit in cocoa could be made in ways beyond colonial plantations and shipping. By the 1700s, pharmacists often stocked chocolate, both as medicine for many ailments it supposedly treated and as a way to mask the taste of other medicine. Evidence indicates German pharmacists as early as 1656 stocked cocoa beans and chocolate. Some branched away from pharmaceutical uses to concentrate on just the chocolate, to sometimes enormous success. The founders of J. S. Fry in England, Neuhaus chocolate in Belgium, Lindt in Switzerland, Debeuve and Gallais and Menier chocolate in France all came from pharmacy backgrounds. Many pharmacists advertised their chocolate products (Fluckiger 1876; Dillinger et al. 2000; Squicciarini and Swinnen 2016).

Fry had bought a 1729 patent of Walter Churchman, also a pharmacist, for a new invention, a machine “for the expeditious, fine and clean making of chocolate” (Curtis 2013, n.p.). As one of the earliest manufacturers of chocolate, Fry by 1776 had five agents in the United Kingdom, but chocolate manufacturing came even earlier to the North American colonies. It was concentrated in Boston, New York, Philadelphia, and Newport, Rhode Island, with extensive West Indian contacts for cocoa. Much of the American colonies’ cocoa during this period probably came from British West Indies colonies (Grivetti and Shapiro 2009). Advertisement for machine-based chocolate-grinding operations in the colonies can be found as early as 1737, when on September 5 an advertisement in the *Boston Gazette* touted, “By a gentlemen of this Town, Salem, is this Day bro’t to perfection, and Engine to Grind Cocoa” (quoted in Miller 2021).

Baker’s Chocolate, the oldest brand in North America, began production under John Hannon in 1665. James Baker, who financed the operation, purchased it a few years later. The Baker family grew the business into North America’s largest chocolate manufacturer by the end of the nineteenth century. The brand still existed in 2021, owned by Kraft Heinz, a food conglomerate (The Bostonian Society 2005).

Mechanization continued to replace the old hand-grinding operations in the nineteenth century. A mechanical grinder, or *melangeur*, was invented in 1826 by Swiss chocolate maker Philippe Suchard. Also, in the 1820s, two inventions by Dutch business owners Caspardus and Coenraad Van Houten, father and son, revolutionized chocolate manufacturing to introduce what was once a costly indulgence to a mass public. The Van Houten cocoa press quickly turned a fat-laden liquid into a dry powder by squeezing the cocoa butter content from about 50 percent to about 20 percent or less. And an alkalizing process, called Dutching for its country of origin, treated the powder to make it more easily worked and mixed with water.

In 1828, J. S. Fry tried returning some of the cocoa butter to the powder to create a chocolate that could be easily molded into shapes or bars. The stable bars

could be wrapped and sold as a quick snack from rail station kiosks just as the Industrial Revolution put teams of workers into the city and onto commuting trains. The chocolate bar changed the way the world consumed chocolate, no longer exclusively a beverage, but now a handy impulse buy.

The growth of chocolate in the industrial age fed profits to manufacturers who now could produce on an industrial scale and distribute countrywide and worldwide. Fry grew into the world's largest chocolate manufacturer of the nineteenth century. Rivals Cadbury and Rowntree in Britain fought for market share with Menier, a French giant, and other large rivals of the age, including Suchard, Cailler, and Van Houten. Powerful confectionary dynasties grew to dominate a once artisanal production.

But at the cacao growers' end, less had changed beyond geography. When Brazil became independent, the Portuguese monarchy was not about to lose a lucrative cacao operation along with its colony. So, in one of many business coups made over chocolate through the centuries, Portuguese king John VI in 1819 ordered seedlings taken from Bahia and transported to another colony, this one in West Africa. The islands of São Tomé and Príncipe in the Gulf of Guinea had been Portuguese colonies since the 1500s. Their colonial profit was at first drawn from sugar plantations based on slave labor. When the three-way transatlantic slave route from West Africa grew in the 1500s, the islands also served as a victualing point for slavers. By the 1800s, it had grown to be an important producer of coffee, also farmed by slaves. This bleak legacy of forced labor as cacao supplanted sugar and coffee would not change (Macedo 2016).

Portuguese investors brought the plantation system from Bahia with them but transformed its efficiency with industrial techniques developed in the late nineteenth century. Highly capitalized, cacao landlords forced creole coffee farmers to sell their land for cacao cultivation, then introduced modern techniques of "plantation science." These included clearing large swaths of forest for cacao cultivation, installing electric lights, turbine engines, and economies of scale. The operation became a turn-of-the-century world wonder, with other countries' capitalists visiting to marvel at the new techniques. But plantation labor told a different story (Nevinson 1906; Macedo 2016).

Seven huge plantations established such efficiency that by the early twentieth century the tiny islands had become the world's largest single producer of cocoa. While soaring chocolate consumption brought the biggest manufacturers to ports of what became known as the Chocolate Islands, the plantations' modern efficiencies were profitable based on the same old requirements that had served the cocoa farming industry from its inception: slavery.

It is perhaps not surprising that the Chocolate Islands, a central node for West African slavery nearly since the beginning of Portuguese control, would not easily be able to establish a new approach built on free labor. But slavery had become discredited in much of the world by the rise of cacao in São Tomé and Príncipe. In 1870, it was outlawed in Portuguese colonies. Habits of 350 years did not so easily change. An investigation of the islands' cacao operations in 1904–1905 by journalist Henry Nevinson revealed that in fact the colony was importing some four thousand slaves a year from Angola, also a Portuguese colony and traditional

home of slaves shipped to the New World (John 2002; Nevinson 1906). Nevinson wrote that plantation proprietors, mostly from Lisbon, displayed plantation housing and hospitals that “all looked as perfect and legal as an English school.” The truth, however, was that a plantation may control up to one thousand slaves shipped from the mainland (Nevinson 1906, 190). Nevinson may have exaggerated his accusation that they were “slaves,” as the system after 1880 had evolved to the point where chattel slavery was uncommon. Coerced labor, however, replaced it, and promises that Africans forced to work in the plantations could return home to the mainland after a few years were seldom honored. In effect, it was slavery, as Nevinson believed. The Portuguese called it “contract labor,” but critics believed that to be simple window dressing (Higgs 2012).

At this time, before the big U.S. chocolate manufacturers had grown to dominate retail production, concern over the operation centered in Britain. Walter Baker, the largest U.S. chocolate manufacturer at the time, no longer sourced from the Chocolate Islands. But British giants Fry, Cadbury, and Rowntree did. William Cadbury decided to investigate. He sent his own agent, Joseph Burt, to evaluate the allegations on site. Burt corroborated Nevinson’s discoveries. In a 1907 preface to a book describing conditions, Cadbury wrote, “Confirmation of all the worst reports that have from time to time filtered through to the public, of the inhuman treatment of the weaker races of this vast district, by white men” (Higgs 2012; Cadbury, Burt, and Horton 1910, viii).

Portuguese colonial authorities argued that in fact they were doing African natives a favor. They said conditions on the plantations were better than those at home in Angola and that work provided the natives with a “civilizing influence.” They also promised they would try to root out abusive practices, but Cadbury was not convinced. In 1907, the Cadbury company, Rowntree, Fry, and Stollwerck in Germany boycotted cocoa from the Chocolate Islands. World War I turned thoughts away from slavery in the cocoa sector, but a 1925 report indicated it still was part of the islands’ operations (Higgs 2012; Walker 2007).

Swiss inventions of milk chocolate in bar form, along with conching and tempering to produce a smoother and milder product, launched a twentieth-century boom in industrial chocolate. Cadbury became the world’s dominant supplier. Milton Hershey in 1900 saw the potential of tying the mass-market popularity of milk chocolate to industrial efficiency. Hershey’s assembly lines could roll out candy bars at a price everyone could afford: five cents. The Hershey Bar began the golden age of chocolate-based candy bars in the United States, with iconic brands created by large manufacturers a century ago still available in 2021. Great fortunes grew on a base of mass-marketed chocolate. Mars rose to become the biggest of what today some call “big candy”; after World War II, it rivalled Hershey in the United States and became the world’s largest manufacturer of chocolate by 2021. Frank Mars made several unsuccessful attempts to market his chocolate, but in 1924 the introduction of Milky Way, competing with Hershey at five cents, was a hit, and in its first year brought the company \$800,000 in sales. In 1929, Mars moved to Chicago (Mars n.d.; Walker Art Center 2021). The company in 2021 was still privately owned, making the Mars family the third richest family dynasty in the United States (Companies History n.d.; Forbes 2020).

Consolidation within the cocoa sector, both at the level of retail manufacturing and wholesale processing, has been a recurrent part of chocolate business history since Cadbury acquired rival Fry in 1919. Many sell much more than chocolate. Walter Baker and Company was acquired in 1927 by Postum, the company that became Kraft Foods. Curtiss Candy Co. of Chicago, maker of the Baby Ruth candy bar, for a time best-selling bar in America, sold out to Standard Brands in 1964; it was acquired by Nestlé in 1989, which later sold it to Ferrero Rocher.

Toward the end of the twentieth century, reflecting an international emphasis on deregulation, acquisitions and mergers grew rapidly, to the point where the cocoa sector became dominated by a few enormous players. Of the big five manufacturers listed below, in chocolate brands Mars acquired Dove Bars in 1986 and KIND in 2020. Nestlé purchased KitKat maker Rowntree in 1988, but in 2021 did not manufacture the bar in the United States, where Hershey owns the rights to it and Cadbury's Dairy Milk. In 2005, Hershey also acquired the well-known U.S. craft chocolate brand Sharffen Berger. Nestlé, the enormous Swiss food company that owns hundreds of brands worldwide, acquired Swiss chocolate brand Peter-Cailler-Kohler in 1929. In 2021 it still sold Cailler chocolate in Europe, but Peter chocolate had become part of Cargill brands. Nestlé actually divested itself from most of its familiar American chocolate brands, including Nestlé Crunch, in 2018, selling to Italian family-owned brand Ferrero Rocher. Ferrero grew relatively recently to its status as one of the top five world chocolate brands based on an aggressive acquisition policy that added not only most of Nestlé's U.S. brands but also acquired Ferrara Candy (maker of Brach's) and in Britain, Thornton's.

Mondeléz became a new multinational chocolate brand after Kraft Foods acquired British chocolate giant Cadbury in a 2011 deal that infuriated many British consumers who argued for the independence of the iconic British name. In another controversial acquisition, Nestlé acquired British chocolate maker Rowntree and its well-known worldwide KitKat brand. Nestlé's hostile 1988 takeover bid against rival Jacob Suchard ended in acquisition of what at the time was the world's fourth largest chocolate company, bringing under the Swiss titan's control the Mackintosh, Menier, and Laura Secord brands. As Nestlé had gained a reputation for unethical business practices related mostly to its baby formula marketing in Africa, the Rowntree acquisition left many in Britain with a sullen resentment toward the Swiss giant (Cadbury 2010). Suchard, in turn, was acquired by Kraft Foods in 1990. Its chocolate brands moved to the Mondeléz umbrella. Yildiz Holdings of Turkey acquired Godiva chocolate in 2007 from Campbell Soup Company. Lindt & Sprüngli, a slightly smaller player emphasizing higher-end chocolate, responded in 2014 by acquiring gift-box brand Russell Stover/Whitman's, and Ghirardelli of San Francisco, established in 1852, the second oldest U.S. chocolate brand after Baker. San Francisco brand Guittard, established 1868, was by 2021 still independent and family owned (Carpenter 2018).

In the 1990s, small chocolate manufacturers began to spring up as a response to critics who argued that "big candy" not only produced low-quality products but did not do enough to help cacao farmers who continued to struggle in poverty and hardship. The fine-chocolate "bean-to-bar" movement by 2021 had grown in North America and Europe to hundreds of operators. Some of the earliest brands,

such as Scharffen Berger, who apparently coined the “bean-to-bar” name, and Green & Black’s of the United Kingdom are now part of large conglomerates (Green & Black’s was acquired by Mondeléz). Many others are still independent. Best known in 2021 included Dandelion in San Francisco, Askinosie in Springfield, Missouri, Taza in Somerville, Massachusetts, Theo in Seattle, Tony’s Chocolonely in Amsterdam, and To’ak Chocolate of Ecuador. Valhrona Chocolate of Tain l’Hermitage, France, is not small but was considered by many pastry chefs to offer among the highest quality couverture chocolate.

Nearly invisible to consumers, but powerful players in the cocoa sector, are the cocoa processors, sometimes called cocoa grinders. These companies acquire beans from farmers and cooperatives, roast and grind, and sell the chocolate to retailers for bars or couverture. Processing underwent dramatic consolidation in the first two decades of the twenty-first century, from about twenty major players in the 1990s to three in 2021. Of the big three, two (Cargill and Olam) brought no history of cocoa processing to the industry. The number one processor, Barry Callebaut, did have a long history in the cocoa sector. Cocoa Barry of France merged with Belgian chocolate maker Callebaut in 1996 to become an enormous multinational with an interest in consumer sales. It promotes the Callebaut brand (a chocolate company dating from 1911) and recently has introduced what it calls a fourth type of chocolate, ruby. Barry Callebaut in 2021 also maintained a more public-focused role by offering its Chocolate Academy, a training program for professional chocolatiers. Its Wieze, Belgium, processing plant was the world’s largest; in 2018 it produced 340,000 tons of chocolate. About a quarter of all global products contain chocolate produced by Barry Callebaut (Confectionary Production 2018).

The second largest processor, Cargill, has nineteenth-century origins as a grain dealer in Minneapolis. Still family owned with Minnesota headquarters, the huge multinational entered the cocoa sector by acquiring European processors General Cocoa Company Holland and Gerkins in 1987. Cargill sells a wide variety of couverture and other cocoa to the trade, marketed under several brands, including Peter, original Swiss developer of milk chocolate. It also sells Wilbur Buds, the candy that gave Milton Hershey the idea for Hershey’s Kisses (Squicciarini and Swinnen 2016; Cargill n.d.). Olam International Limited, the newest to enter the cocoa sector, acquired Archer Daniels Midland’s (ADM) cocoa-processing operation in 2015. Olam is based in Singapore. Together in 2016 these three companies controlled about two-thirds of worldwide cocoa-grinding operations. Some grinding operations, traditionally undertaken far from producing countries, today have moved back to the lands from which cacao is grown. Big processors have set up grinding operations in Ivory Coast, Ghana, and other countries. The automated operations do not require a large labor force, however, so do not bring great economic benefit to producing countries (Leissle 2018).

Bean-to-bar operations grew in the 1990s not only as a response to the purported low quality of mass-market chocolate but also because the large operators were perceived as unmotivated to pursue improvements in sustainability through the cacao chain. Cacao farming throughout its history has enriched absentee proprietors who built fortunes on the backs of natives, slaves, or coerced laborers. It had been presumed that, at the least, while smallholding cacao farmers were poor,

by the end of the twentieth century they were no longer enslaved or coerced. A bombshell BBC investigation in 2000 found otherwise. Human trafficking of children from Mali and Burkina Faso to cacao farms in Ivory Coast were producing a new coerced labor, the children forced by threat of violence to work in dangerous conditions (Lawrance and Roberts 2019; Schrage and Ewing 2005). Government investigations followed, and all large concerns promised to remove child labor from the cocoa sector. As of 2021, however, an estimated 1.48 million children were still working on cacao farms (NORC 2020).

The large plantation system of past centuries has mostly been abandoned. Smallholders have a competitive advantage over large plantations with their high labor costs and risk of disease. Big manufacturers and producers also have been the target of reformers who have argued against their marketing practices and environmental concerns. Most criticized has been Nestlé for its baby-formula marketing efforts in Africa. A worldwide boycott of the company in the 1970s led to a pledge by the Swiss multinational to improve, although some critics say it has not done enough (Neslen 2018). In 2021, the U.S. Supreme Court ruled on a case dating from the years following the child labor scandal; unnamed plaintiffs argued that Cargill and Nestlé “were complicit in the use of child slave labor on cocoa farms in the Ivory Coast.” The court, however, in an 8–1 decision rejected the claim, concluding the multinationals were not responsible for human rights abuses on the farms (Nelson 2021).

By 2021, all large manufacturers and processors had pledged to support programs aimed at improving sustainability by helping farmers thrive and by rooting out coerced or child labor. Mars as number one promised in 2021 through its Cocoa for Generations program to invest one billion dollars over ten years for sustainability programs that aim to improve lives for cacao farmers and work to protect the environment (Mars 2020). Ferrero Rocher at number two in 2021 reported it had made progress in its Ferrero Farming Values Cocoa Program (Ferrero 2021).

Cocoa-producing countries themselves have taken steps to pull some of the enormous wealth of a \$130 billion-a-year industry back into the hands of the rain-forest belt workers who continue five hundred years after Cortés to find themselves on the short end of the profit chain. In 2020, of cocoa chain stakeholders, retailers received 44.2 percent, manufacturers 35.2 percent, processors 7.6 percent, and farmers 6.6 percent. In Ivory Coast, with 600,000 cacao farmers, the average earning was 97 cents a day, and in Ghana, with 800,000, even less. The World Bank in 2021 established the threshold for extreme poverty at \$1.90 a day (Bhutada 2020; World Bank 2021; Yock n.d.).

In 1987, Ivory Coast, the world’s largest cocoa supplier at about 40 percent (neighboring Ghana is second largest at 30 percent), tried an embargo of exports to Europe as a way to raise prices. The “cacao war” of July 1987 to October 1989 failed, however, as the often-volatile commodity price of cocoa did not increase. The country’s cocoa stabilization board was eliminated and the cocoa sector was freed from state control, but political instability made it difficult for the country to enforce pricing policies or regulations against deforestation (Squicciarini and Swinnen 2016; Higgs 2012; Pearce 2019). In 2019, Ghana and Ivory Coast

introduced a Living Income Differential (LID) to help assure farmers a reasonable price for their cacao harvests. The 2020 season required a \$400 a ton premium above world cocoa prices. The industry supported the plan (Agroberichten Buitenland Nieuwsbericht 2021; Uncommon Cacao 2020). However, a weakened global cocoa demand blamed on the 2020 pandemic, combined with a strong harvest, forced the countries to negotiate a cocoa price that either reduced the \$400 LID for farmers or reduced the country premium that is paid to reflect bean quality. An export company spokesman told a reporter that the cocoa would not be globally competitive unless either the LID or premium were reduced; in May 2021, the Ivory Coast governing body retained the LID but lowered the country discount, thereby reducing government revenue from cocoa sales (Aboa 2021).

TOP GLOBAL CHOCOLATE MANUFACTURERS IN 2020

Mars Wrigley Confectionary, USA, \$18 billion
 Ferrero Group, Luxembourg/Italy, \$13 billion
 Mondeléz International, USA, \$11.8 billion
 Meiji Co. Ltd., Japan, \$9.721 billion
 Hershey Co., USA, \$7.986 billion
 Nestlé S.A., Switzerland, \$7.925 billion
 Chocoladerfabriken Lindt & Sprüngli, AG, Switzerland, \$4.574 billion
 Pladis, UK, \$4.515 billion
 Ezaki Glico Co. Ltd., Japan, \$3.156 billion
 Orion Corp., Korea, \$1.767 billion
 (ICCO 2020)

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Chocolate-Based Recipes

Dotty Curry

Bacon and Date Chocolate Scones

Ingredients

10 ounces thick-cut bacon slices
2 cups all-purpose flour
2/3 cup cocoa
1/2 cup sugar
1 1/2 tsp baking powder
3/4 tsp baking soda
1/2 tsp coarse kosher salt
3/4 cup coarsely chopped pitted Medjool dates
1/2 cup (1 stick) chilled unsalted butter
2/3 cup buttermilk
Raw sugar

Ingredient info: Raw sugar, which is sometimes called turbinado or demerara sugar, is available at most supermarkets and at natural foods stores.

Preparation

1. Preheat oven to 400°F. Line baking sheet with parchment paper.
2. Cook bacon in heavy large skillet over medium heat until cooked through but still tender and not crisp, turning occasionally. Transfer bacon to paper towels to drain; cool. Pour bacon drippings from skillet into small heatproof bowl and reserve.
3. Whisk flour, 1/2 cup sugar, cocoa, baking powder, baking soda, and salt in large bowl.
4. Coarsely chop cooled bacon. Add bacon and dates to flour mixture; toss to coat.

5. Coarsely grate butter into flour mixture. Using fork, stir in butter.
6. Add buttermilk; stir until large moist clumps form. Using hands, knead mixture briefly in bowl until dough forms.
7. Transfer dough to floured work surface. Pat into 8-inch round. Cut into 8 wedges.
8. Transfer scones to sheet. Cover and chill scones at least 2 hours.
9. Brush with reserved bacon drippings. Sprinkle with raw sugar.
10. Bake scones until golden brown and tester inserted into center of scones comes out clean, 16 to 18 minutes. Serve warm or at room temperature.

Do ahead: Can be made up to eight hours ahead. Cool completely; store airtight at room temperature.

Slow-Cooked Caribbean Pot Roast

Yield: 10 servings

Ingredients

- 1 15-ounce can of diced tomatoes
- 2 medium sweet potatoes, cubed
- 2 large carrots, sliced
- 1/4 cup chopped celery
- 1 boneless beef chuck roast (2 1/2 pounds)
- 1 tablespoon vegetable oil
- 1 large onion, diced
- 2 garlic cloves, minced
- 1 Tbsp all-purpose flour
- 1 Tbsp sugar
- 1 Tbsp brown sugar
- 1 tsp ground cumin
- 1/2 teaspoon salt
- 3/4 tsp ground coriander
- 3/4 tsp chili powder
- 1/2 tsp dried oregano
- 1/8 tsp ground cinnamon
- 3/4 tsp grated orange zest
- 1 tsp baking cocoa
- 1 can (15 oz.) tomato sauce

Preparation

1. Place diced tomatoes, potatoes, carrots, and celery in a 5-qt. slow cooker.
2. In a large skillet, brown meat in oil on all sides. Transfer meat to slow cooker.
3. In the same skillet, sauté onion in drippings until tender. Add garlic; cook 1 minute longer.
4. Combine the flour, sugar, brown sugar, seasonings, orange zest, and cocoa. Stir in tomato sauce; add to skillet and heat through. Pour over beef.
5. Cover and cook on low until beef and vegetables are tender, 6 to 8 hours.

Chocolate Tart Cherry Cookies

Ingredients

1 1/2 cups dried cherries
1 cup balsamic vinegar
1 cup all-purpose flour
1/4 cup Dutch-processed cocoa powder
1 tsp baking powder
1/4 tsp salt
1/2 cup butter, softened
1 cup white sugar
1 egg plus 1 yolk
1 tsp instant coffee granules
1 tsp vanilla extract
1/2 cup white chocolate chips

Preparation

1. Very coarsely chop the dried cherries. Bring balsamic vinegar to a boil in a small bowl. Add the cherries to the vinegar and let macerate for at least 2 hours or overnight.
2. Preheat oven to 350°F. Line two baking sheet pans with parchment paper.
3. Combine flour, cocoa powder, baking powder, and salt in another bowl.
4. Beat the butter and sugar together with an electric mixer on medium-high speed until light and fluffy.
5. Beat the eggs, coffee granules, and vanilla into the butter and sugar mixture until blended.
6. Change the mixer speed to low and add the dry ingredients, one-third at a time. Mix until just blended.
7. Drain the balsamic vinegar off the cherries.
8. Stir cherries and chips into dough.
9. Drop spoonfuls of the dough two inches apart on the prepared baking sheets.
10. Bake 10 to 12 minutes or until cookies are just starting to become firm. Let cool for 5 minutes before taking them off the sheets.

Chocolate BBQ Sauce

Ingredients

2 Tbsp olive oil
1 medium onion, chopped
2 cloves garlic, finely chopped
1 1/2 cups ketchup
1/4 cup strong brewed coffee
1/4 cup light brown sugar, lightly packed
3 Tbsp honey
3 Tbsp aged balsamic vinegar
1 1/2 ounces bittersweet chocolate 70%, chopped

2 Tbsp Worcestershire sauce
2 tsp dry mustard
1 tsp kosher salt
1/2 tsp chipotle chili powder
1/2 tsp freshly ground black pepper
Sriracha Sauce to taste

Preparation

1. Heat olive oil in a 4-qt. saucepan over medium-high heat.
2. Add onions and cook until soft, about 5 minutes. Stir in the garlic and cook until fragrant, about 1 minute.
3. Stir in the remaining ingredients and continue to stir until the chocolate has melted and the sugar has dissolved.
4. Continue cooking at a low simmer, stirring frequently, until the sauce has thickened, about 10 minutes.
5. Taste and adjust sriracha and salt as needed.

Note: Serve right away or save the remaining sauce refrigerated in an airtight container for up to two weeks.

Summer Salad with Chocolate Dressing

Ingredients

For salad:

- 4 strips of thick-cut bacon, cooked until crispy, cooled and crumbled
- 1 package (5 oz.) spring mix salad greens
- 1 1/2 cups fresh spinach
- 1 carton (8 oz.) fresh mozzarella cheese pearls
- 1 1/2 cups sliced fresh strawberries

For Dressing:

- 1/4 cup dark chocolate chips
- 1/4 cup balsamic vinegar
- 1/4 cup olive oil
- 1 teaspoon honey
- 1/4 teaspoon salt
- 1/8 teaspoon pepper

Preparation

1. In a small skillet, cook bacon over medium heat until crisp. Remove to paper towels with a slotted spoon; drain and set aside.
2. Divide salad greens and spinach among six salad plates. Arrange cheese, strawberries, and bacon over greens.
3. In a microwave, melt chocolate; stir until smooth. Whisk in the vinegar, oil, honey, salt and pepper. Drizzle over salads.

Chocolate Pecan Pie

Serving: 1 pie

Ingredients

1 (9 in.) unbaked pie shell
2 cups pecan halves
3 large beaten eggs
3 Tbsp melted butter
1/2 cup dark corn syrup
1 cup sugar
2 Tbsp good-quality bourbon
3 ounces chopped semisweet chocolate

Preparation

1. Preheat the oven to 375°F.
2. Cover bottom of pie crust with pecans.
3. In a medium bowl, whisk together the eggs and melted butter. Add the corn syrup, sugar, bourbon, and the chopped chocolate. Stir until all ingredients are combined. Pour mixture into the pie shell over the pecans and place on a heavy-duty cookie sheet.
4. Bake for 10 minutes. Lower the oven temperature to 350°F and continue to bake for an additional 25 minutes or until pie is set. Remove from oven and cool on a wire rack.

Chocolate Zucchini Bundt Cake

Ingredients

The cake:

3/4 cup unsalted butter, softened
1 cup white sugar
1/2 cup brown sugar
4 large eggs
2 tsp vanilla extract
1/2 cup buttermilk
3 cups shredded zucchini (see note below)
2 1/2 cups all-purpose flour
1/2 cup cocoa powder
2 tsp baking powder
1 tsp baking soda
1 tsp salt
1 tsp cinnamon
1/2 tsp nutmeg

The Glaze:

- 1 1/4 cup semisweet chocolate chips
- 1/3 cup whipping cream

Preparation

1. Preheat oven to 350°F. Spray a 12-cup bundt pan with nonstick pan spray.
2. Beat the butter and sugars until light and fluffy. Add the eggs and vanilla and beat again.
3. Stir together the flour, cocoa powder, baking powder, baking soda, salt, cinnamon, and nutmeg.
4. Add the dry ingredients alternately with the buttermilk until everything is incorporated. Stir in the zucchini by hand.
5. Pour into prepared pan. Bake for 50 to 60 minutes or until a toothpick inserted into the center of the cake comes out clean.
6. Remove and let cool for 15 minutes. Flip out on to a plate and let it cool completely.
7. Place the chocolate chips and heavy cream in a microwave safe bowl. Heat for 30 seconds. Stir until melted and creamy. Let cool slightly, then spoon over the top of the cake.

Note: If your zucchini is really wet after you grate it, squeeze the excess water out BEFORE adding it to the cake.

Chocolate-Glazed Korean Pulled Pork Tacos

Ingredients

- 1/2 cup light (reduced-sodium) soy sauce
- 1/2 cup water
- 3 Tbsp brown sugar
- 2 Tbsp sesame oil
- 1 Tbsp baking cocoa
- 3 tsp chili powder
- 1 garlic clove, minced
- 1/4 tsp ground ginger
- 1/2 cup diced onions
- 1 boneless pork shoulder butt roast (4–5 pounds)

Slaw:

- 2 Tbsp sugar
- 2 Tbsp light soy sauce
- 1 Tbsp Sriracha chili sauce
- 2 tsp sesame oil
- 1 tsp rice vinegar
- 1 package (14 oz.) prepared coleslaw mix

1 Tbsp toasted sesame seeds, optional

20 flour tortillas (6 in.), warmed

Thinly sliced green onions and additional Sriracha chili sauce

Preparation

1. Whisk together first nine ingredients. Place roast in a 6-qt. slow cooker. Pour soy sauce mixture over top. Cook, covered, on low until pork is tender, 8–10 hours.
2. Prepare the slaw dressing.
3. Whisk first five slaw ingredients until blended set aside to let it blend.
4. About an hour before serving, place coleslaw mix in a large bowl; toss with dressing and, if desired, sesame seeds. Refrigerate, covered, until serving.
5. Remove roast; skim fat from cooking juices. Shred pork with two forks; return to slow cooker and heat through.
6. Serve in tortillas topped with slaw. If desired, serve with green onions, shredded pepper-jack cheese, or additional Sriracha sauce.

Note: The pulled pork can also be frozen in portions after cooking, thawed and warmed before serving.

Grand Marnier Hot White Chocolate

Time: 5 minutes

Yield: 2 servings

Ingredients

2 ounces best quality white chocolate chopped

1/2 cup brewed coffee

1/2 tsp vanilla extract

1 1/4 cup half and half (may substitute milk if desired)

4 tsp Grand Marnier liqueur

Grated nutmeg for garnish

Preparation

1. Melt chocolate in small heavy saucepan over very low heat stirring frequently.
2. Stir in coffee and vanilla until smooth.
3. Add half and half (or milk), then increase heat to medium and heat until mixture is hot but not boiling.
4. Pour mixture into a blender container and blend until frothy.
5. Pour chocolate into 2 cups and stir in 2 tsp Grand Mariner in each cup.

Mexican Chocolate Iced Coffee

Ingredients

6 Tbsp sugar
2 Tbsp unsweetened cocoa powder
2 1/2 tsp chili powder
1 1/2 tsp cinnamon
1/2 cup water
2 cups cold coffee
ice
milk/cream of choice

Preparation

1. Sift sugar, cocoa, chili powder, and cinnamon together.
2. Mix 1/2 cup cocoa mix with 1/2 cup water. Heat in microwave for 20–30 seconds until sugar mix dissolves into water. Chill.
3. Stir cocoa “syrup” into 2 cups cold coffee.
4. Serve over ice with milk or half & half.

Optional: add one or more:

Tabasco to taste
1/4 teaspoon cayenne pepper
1 ounce Vodka or Tequila

Peach and White Chocolate Chip Muffins

Yield: Makes 16 muffins

Ingredients

1 3/4 cup all-purpose flour
1 cup sugar
1 tsp baking powder
1/2 tsp baking soda
1/2 tsp salt
1/2 tsp ground cinnamon
3 large eggs
1/2 cup vegetable oil
1 1/2 tsp vanilla
1 cup peaches, chopped
3/4 cup white chocolate chips
1/2 cup confectioners’ sugar
1 Tbsp water

Preparation

1. Preheat oven to 350°F. Line muffin tins with paper cups.
2. In a large mixing bowl combine flour, sugar, baking powder, baking soda, salt, and cinnamon. Make a well in the flour mixture and add eggs, vegetable oil, and vanilla and mix well. Fold in peaches and white chocolate chips.
3. Pour mix into muffin tins two-thirds full.
4. Bake for 20–25 minutes until tops are golden brown and tester inserted into center comes out clean. Let muffins slightly cool in pan and remove to wire rack.
5. While muffins are still warm mix together confectioners' sugar and water. Dip tops of muffins into glaze and set on wire rack to cool completely.

Salted Chocolate Chip Cookies

Yield: 36 cookies

Ingredients

- 1 cup salted butter, softened
- 1 cup white sugar
- 1 cup light brown sugar
- 2 1/2 tsp pure vanilla
- 2 large eggs
- 3 cups all-purpose flour
- 1 tsp baking soda
- 1/2 tsp baking powder
- 1 tsp sea salt (not table salt) plus 1/2 cup of sea salt for topping cookies
- 2 cups semisweet chocolate chips or chunks

Preparation

1. Preheat oven to 375°F. Line a baking pan with parchment paper and set aside.
2. In a separate bowl, mix flour, baking soda, salt, and baking powder.
3. Cream together butter and sugars until combined.
4. Beat in eggs and vanilla until fluffy.
5. Mix in the dry ingredients until combined.
6. Add semisweet chips and mix well.
7. Roll 2 Tbsp of dough at a time into balls. Slightly flatten the balls and quickly dip the top in water or brush on water with a pastry brush, then sprinkle sea salt over wet side of cookies.
6. Bake in preheated oven for approximately 8–10 minutes. Take them out when they are just *barely* starting to turn brown. They will still look a little doughy. Don't overbake!
7. Let them cool for a couple of minutes before removing to cooling rack.

The Darkest Heart

Ingredients

Truffle heart:

8 ounces chopped semisweet chocolate
5 Tbsp heavy whipping cream

Cakes:

5 ounces unsalted butter
8 ounces semisweet chocolate
2/3 cup all-purpose flour
1/2 cup unsweetened cocoa
3 Tbsp espresso powder
3 large eggs
2 large egg yolks
1/2 cup granulated sugar

Preparation

1. Make the truffle hearts: Place 8 ounces of semisweet chocolate and heavy cream in a microwave bowl.
2. Microwave 30 seconds at a time, stirring completely in between heating until the mixture has no more lumps.
3. Place this ganache in the refrigerator for 30 minutes or firm to the touch. Portion into 12 pieces. Line a plate with parchment paper.
4. Roll each portion of chocolate in your palms using a circular motion until a smooth orb is formed.
5. Place all the truffles on the parchment and put in the freezer for at least an hour. This can be done the day before you make your cakes, if desired.
6. Make the cakes: Preheat oven to 325°F.
7. Spray 12 muffin cups with a pan spray and set aside until needed.
8. Melt butter and 8 ounces semisweet chocolate in a double boiler over medium heat. Set aside to cool slightly.
9. In a bowl, mix together the flour, cocoa, and espresso powder.
10. Place 3 eggs, 2 yolks, and 1/2 cup sugar in the bowl of an electric mixer fitted with a paddle. Beat on medium for about 2 minutes until slightly frothy.
11. Reduce speed to low and add the chocolate and butter mixture. Mix until combined then scrape down bowl with a rubber spatula.
12. Continue to mix on slow and gradually add the dry ingredients and vanilla extract, occasionally scraping down the sides of the bowl.
13. Remove the bowl from the mixer and use a rubber spatula until everything is thoroughly combined.
14. Pour the batter into prepared 12 muffin cups (about 3 Tbsp each). Bake on center rack of oven for 5 minutes.
15. Remove the muffin pan from the oven and the truffles from the freezer. Press one truffle about halfway down in each cake.

16. Continue baking for about 18 minutes or until a toothpick inserted into the cake—not the truffle—comes out clean. Let cool for 20 minutes.
17. Run a sharp knife tip around the top edges and loosen them by giving a slight twist. Gently pull out each cake.

Note: You may serve them warm or let them cool to room temperature. Keep at room temperature for two days or up to a week in the refrigerator.

Chocolate Entries: A to Z

A

Adulteration

It is easy to add ingredients to chocolate. The strong flavor usually hides the taste of other things, and the dark color makes them hard to see. Chocolate from its beginning in pre-Columbian America offered a temptation seldom resisted to add a wide variety of flavorings and extenders. Flavors such as sweeteners, vanilla, cinnamon, nutmeg, or Mesoamerican favorites like chili and ear flower were added for possible enhanced health benefits as well as palatability. These are not adulterants because they do not serve to extend, cheapen, or threaten the safety of chocolate as a bar or drink. But the idea of surreptitiously adding cheap substitutes for chocolate to save on cocoa butter, to enhance color, to extend cocoa mass, or even to poison an enemy has been part of chocolate since Aztec days. Spices and, almost universally, chili peppers from mild to hot were favored in early Maya and Aztec chocolate beverages. But the elite drinkers apparently considered them adulterants. Maize (corn) was added as a Mesoamerican ritual or for nutrition, while annatto, a red dye, was added in another ritual to symbolize blood. Actual blood sometimes was added, water from which knives used in human sacrifices were washed (McNeil 2006).

Europeans who picked up the chocolate habit did not (as far as we know) add blood or corn, while other favored native flavors did earn popularity in Spain. But the wide variety of additives that producers hoped would enhance chocolate included some less attractive ones with a less salubrious goal.

Cocoa from its earliest days was presumed to be a medicine but one that needed enhancing to produce best effect. Additions were often harmless. Sometimes they were not. As early as 1672 English physician William Hughes in *The American Physician* criticized “the adulteration of this nectar,” which he said in its pure form was the healthiest (quoted in Albala 2007, 66). But his appeal apparently failed to impress, as producers for another century and a half seldom offered chocolate without some sort of additive beyond the ubiquitous sugar. Colonial Americans shared general concern with Europeans that chocolate could be adulterated without easy detection. Colonial Boston newspaper advertisements in 1771 promoted chocolate “warranted pure from any adulteration” (Grivetti and Shapiro 2009). These included the common extenders of starches or fats but also the purported “medical extenders” of insects, reptiles, or by the nineteenth century, iron oxide and opium.

Growth of giant chocolate manufacturers in the 1800s did little to abate concerns of adulteration. In fact, early manufacturers commonly added extenders such as arrowroot and flour. “Health chocolate” advertisers argued that their product could help the tired by adding, in particular, iron either in oxide, carbonate, or

actual shavings. An 1843 advertisement from a French newspaper emphasized “ferrugineux” health chocolate “to cure pale color, stomach aches, losses, weaknesses and child illnesses” (*Le Constitutionnel* 1843, n.p.). Pharmacists commonly added chocolate to disguise the taste of medicines, one reason why pharmacies became some of the earliest purveyors of chocolate in Europe and colonial North America.

But by the 1850s, a general European sanitary movement shifted weight of concern to a more serious look at exactly what was going into the chocolate that was becoming more and more popular. In 1851, a series of reports by Arthur Hill Hassall of the British Sanitary Commission in *The Lancet* shocked the public with a scathing analysis of British chocolate adulteration. Almost all chocolate contained starches; other common additions included animal fat, vegetable oil, brick dust, ground cocoa shells, and a variety of possible poisons such as minium (red lead, a pigment for painting) (Hassall 1855).

Two of the biggest British cocoa producers, Cadbury and Fry, admitted they added starches to their drinking cocoa. Fry contended these improved the product, as they soaked up some of the objectionable fat and produced a thicker beverage. Cadbury, apparently sensing the public’s disapproval, instead launched an advertising campaign to declare that its product was (now) the purest. While some historians argue that Cadbury responded to public pressure, others (Cadbury 2010) contend Cadbury launched its renowned purity advertising campaign in a desperate bid to keep what was then the smallest of the Quaker-led British chocolate firms from bankruptcy. Its “Cocoa Essence,” drinking chocolate, made using the Van Houten process that pressed some of the fat from the cocoa, was aggressively advertised as “Absolutely Pure, Therefore Best.” The public responded to the campaign, though its 1867 launch was sixteen years after Hassall’s initial scathing report on the state of chocolate adulteration (Cadbury 2010; Wagner 1987).

Purity advertising became a mainstay of chocolate companies in Europe and the United States throughout the rest of the century as public concern turned to government regulation. In 1860, the British government passed pure food laws, toughened in 1875 to make adulteration of chocolate and other foods a crime. Other countries followed Britain’s lead, although sometimes much later. France did not move to control ingredients in chocolate until 1910 (Squicciarini and Swinnen 2016).

In 2021, most governments had tight restrictions against chocolate adulteration. But not every substance added is considered an adulterant. In addition to the typical enhancements such as sugar, vanilla, and milk powder, producers can add lecithin as a type of emulsifier and process with an alkali to produce a milder, darker product, called Dutching. More controversial, however, is the substitution of vegetable fats for the more expensive cocoa butter.

British, Irish, and Danish chocolate makers for generations often created their traditional favorites with the addition of a small amount of vegetable fat as a cocoa butter substitute, called in the industry a cocoa butter equivalent (CBE). When these countries in 1973 joined the European Economic Community, regulations for what became EU standards declared that addition of the fat was an adulterant that precluded the product from sale on the Continent as “chocolate.” After hard

feelings and protests the EU in 2003 relaxed its CBE rule to allow 5 percent. U.S. FDA regulations in 2021 regarding CBEs required the label “milk chocolate and vegetable fat coating,” or specifically indicating what vegetable fat was used, normally palm oil (EU 2016; Squicciarini and Swinnen 2016; U.S. Federal Register Part 163, 2021).

While we can be confident that few adulterants today lurk in our chocolate, pure food laws still allow a small amount of “insect filth” including rodent hairs. These are not dangerous; most food from natural products will contain a little bit as they are impossible to totally eradicate. In chocolate, the U.S. Food and Drug Administration allows up to sixty insect fragments per 100 grams, and one rodent hair per 100 grams (FDA CPG, section 515.700, 2000).

A LIST OF ADULTERANTS (ADDITIVES THAT MAY REDUCE QUALITY OF PRODUCT) THAT HAVE BEEN FOUND IN CHOCOLATE THROUGH THE CENTURIES

Acorns	Eel liver	Rice
Almonds (sweet)	Egg yolks	Rodent hair
Arrowroot	Gum tragacanth	Sago flour
Ashes	Insect fragments	Shea butter
Barley flour	Iron oxide or iron shavings	Snake
Beef lard	Laudanum (tincture of opium)	Sulphate of lime
Beef marrow	Lentil flour	Tallow
Blood	Millipedes	Tapioca flour
Bread	Mutton fat	Wheat flour
Brick dust	Olive oil	Vanillin (synthetic vanilla)
Butter, dairy	Palm oil	Veal suet
Chalk	Paraffin wax	Vegetable fat or vegetable oil
Chicory	Potash (potassium carbonate)	Venetian red (ferric oxide)
Cocoa shells	Potato flour	Vermillion
Coffee	Red lead (minium)	Yellow ochre
Corn	Red ochre	
Dextrin		
Earthworms		

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Alkali, Alkaline Salts

Many people recognize alkali as ammonia, or as the chemical used in drain cleaners, oven cleaners, or other cleaning products. Usually, they are sodium hydroxide or potassium hydroxide, more familiarly called lye. They are corrosive and poisonous. Alkaline salts often are used in dishwasher detergent powders. We do not get them on our skin. We do not drink them.

But we do process chocolate with alkali. Is that dangerous? Probably not. It has been commonly known as the Dutching process since 1845. While our general idea of alkali sounds risky, it depends—an alkali is just a substance that neutralizes acidity. Cocoa beans come to the processor with a high natural acidity that contributes to dark chocolate's slightly (or moderately) bitter flavor. Bitterness of the ancient, usually unsweetened Mesoamerican chocolate probably was part of the reason early Europeans in the New World wrote that they loathed the native drink. Alternatively, they concluded that chocolate must be a medicine, with the presumption that to be good, a treatment must taste bad. Natives encouraged the medicine idea by categorizing cocoa as an agent of healing.

We have evidence that Aztecs tried to tame the acid with a natural alkali, ashes from a wood fire, but we have no evidence that this approach became part of the European cocoa-processing routine (Grivetti and Shapiro 2009). Instead, Europeans early on added sugar to tame the bitterness. Sweetener was not unknown in pre-Columbian cocoa, but as European colonists in Central and South America established copious sugar plantations along with cacao, it became an obvious addition.

The nineteenth century brought enormous industrial and cultural advances to food preparation, including cocoa. After more than three centuries of little change, a Dutch chemist and chocolate maker, Coenraad van Houten, realized that if some of cocoa's acidity could be neutralized the taste could be softened for a more attractive beverage. How is acidity neutralized? By a base, that is, an alkali.

Van Houten did not treat cocoa nibs with drain cleaner. But in 1845 he did patent a process to treat cocoa nibs with another alkali, potassium carbonate. It comes from potash, a natural salt long used in Europe as a chemical leavening agent before baking powder. Adding this perfectly safe chemical to cocoa nibs,

normally before roasting, produces a milder flavor many people prefer and a darker cocoa many find attractive. It also helps the cocoa in hot cocoa stay suspended, as one of the other centuries-old annoyances of traditional chocolate was the tendency for the solids to sink to the bottom. To keep them floating (and raise a froth) ancient Mesoamericans poured their cocoa from container to container. The Spanish invented a *molinillo* (sometimes spelled *molinero*), a sort of whisk that protruded from a clay, ceramic, or silver chocolate pot to keep the solids suspended (Van Houten n.d.).

Van Houten's alkalization process was called Dutching after its country of origin. It spelled the end to a need for the *molinillo* and the beginning of a drink more in line with a growing preference for milder flavors. Dutching reduces the acidity from about 5.5 pH (acidic) to 7 pH (neutral) or 8 pH (a little bit alkaline). This can be important to baking: if a favorite treat relies on baking soda (sodium bicarbonate, an alkali) as a leavening agent, Dutched chocolate will not react with it and the cake will be flat. Regular cocoa, acidic, will offer the chemical reaction that fluffs up the dessert (Velie 2019). (Baking powder, on the other hand, contains both acid and base.)

Dutch-processed cocoa always ends up as a powder. In 2021, the process itself had not changed much. The “alkali wash” treatment may be given to the nibs before or after roasting, and after pressing, the subsequent powder may retain more fat than non-Dutched cocoa (Demichele 2018). U.S. FDA regulations indicated that these alkali ingredients could be used in manufacture of cocoa: ammonium, potassium, or sodium bicarbonate, carbonate, or hydroxide, or magnesium carbonate or oxide (United States Federal Register. Electronic Code of Federal Regulations. 2021. Part 163—Cacao Products). But Dutching is by no means universal. The process by law must be revealed on the label by declaring the cocoa to be “processed with alkali” or including an “acidity regulator” in its ingredient list. Sometimes the process is featured: most cocoa from the Netherlands, the home of Dutching, uses the alkali process, such as the well-known Droste cocoa brand. Cocoa powder in 2021 was still sold under the Van Houten label though it was owned at that time by multinational processor Barry Callebaut. Other brands may or may not be alkalized; consumers can examine the label. Heavily Dutched cocoa is nearly black and is sometimes sold as “black chocolate.” Oreo cookies get their characteristic color from heavily Dutched chocolate. Note: too heavy Dutching will betray itself by a soapy taste (Gordon 2007; Beckett 2000).

While Dutched chocolate is no less safe than non-Dutched, some purists prefer the untreated product for a more natural chocolate flavor. And if we are trying to find the chocolate most apt to offer the greatest health benefits, we probably would not choose Dutched cocoa: research shows the treatment significantly reduces flavanols (Harvard T. H. Chan School of Public Health n.d.).

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Antioxidants

Throughout at least the last five centuries—and most probably before—chocolate has been celebrated for its health-giving properties and healing powers. From its general acceptance in Europe and North America in the 1600s, it was thought to be a cure for nearly every ailment and preservative of health and strength. A few early physicians did voice concerns, particularly because it contains a stimulant like coffee and tea, and because it has a tendency to encourage weight gain that is not to everyone's benefit (Thompson 2015).

But the growing predominance of milk chocolate in bar form beginning in the early twentieth century changed the nature of chocolate from a dark and slightly bitter beverage to a sweet and cheap kids' snack. After World War II, nutritionists began to question the health effects of mass-produced milk chocolate that had become available everywhere, from grocery stores to gas stations. They were not impressed. The high sugar content in particular was thought to cause dental cavities and along with the high milk content certainly was fattening. Chocolate was blamed for migraines, allergies, hyperactivity, and acne. Around 1980, researchers began examining those concerns in greater detail. They discovered the critics generally targeted bars that contained little actual chocolate. Criticism was misplaced. The chocolate itself was not to blame (Frydenborg 2015).

As some nutritionists began to question the presumed evils of chocolate, research in the 1990s began to take a look at a series of substances called antioxidants that were found in cocoa and many other plant-based foods. Medical science has concluded that people's youth and health are daily attacked at the cellular level by chemicals called free radicals. These damage cells but are natural productions of the body's turning food into energy. It is called aerobic cellular respiration. What researchers wanted to know was how the damaging free radicals generated by the process could be reduced. Apparently, the inflammation encouraged by free radicals can damage DNA and encourage low-density lipoprotein (LDL, sometimes nicknamed "lousy cholesterol") to cling to walls of our arteries (Harvard T. H. Chan School of Public Health n.d.; Dennett 2020).

The human body is, of course, accustomed to this natural process and can produce defenses on its own. But it also relies on help from food. The help comes in the form of antioxidants. These cover a wide variety of substances, hundreds, found in all kinds of foods. They range from the Vitamin C that everyone knows about to glutathione and coenzyme Q10, which probably most people have not heard of.

Some of these antioxidants can be found in chocolate. Flavonols, plant-based molecules in many fruits and vegetables, are thought to provide health benefits as antioxidants. They are part of a general class of polyphenols. Of the flavonols found in many fruits (cacao pods are fruits), cocoa flavonols are particularly high in unroasted cacao seeds.

Researchers found cocoa contained primarily the flavonols catechin and epicatechin. A 1999 study of a powerful antioxidant, catechin, in dark chocolate found it contained 53.5 milligrams per 100 grams, four times that of tea—often touted as a good antioxidant that reduces the chance of heart attacks (Beckett 2000). Subsequent research suggested the anti-inflammatory effect of cocoa flavonols could lower blood pressure, blood sugar, and cholesterol. In 2013, the European Food Safety Authority allowed chocolate makers to state that the antioxidants in cocoa could help maintain normal blood pressure (Dennett 2020).

However, more recent research suggested these encouraging claims may need revising. Some research indicated that, at the least, milk chocolate would not provide many antioxidants; white chocolate (containing cocoa butter, milk, and sugar), none at all; and dark chocolate with at least 70 percent cocoa mass, a highly variable amount depending on how it was processed. Critics said cocoa-industry-funded research skewed results and spread myths that cocoa was a superfood when in fact it was not. The large Cocoa Supplement and Multivitamin Outcomes Study (CoSMOS study n.d.) of 22,000 people in 2020 was ongoing. However, a substantial body of recent research still supported the conclusion that antioxidants in dark chocolate may be helpful. And it is certainly true that of the some six hundred substances contained in cocoa, minerals such as iron, magnesium, and zinc can provide benefits. In one of many such studies, 2018 results of a randomized clinical trial of diabetic patients published in the *International Journal of Preventive Medicine* showed administering 84 percent dark chocolate was associated with significant declines in blood sugar, hemoglobin, A1C, LDL cholesterol, and triglyceride levels (Jafarirad et al. 2018).

Nutritionists in 2020 acknowledged, however, that many people do not like the slightly bitter taste of dark chocolate with cocoa mass above about 70 percent. Some researchers have found antioxidant benefits could be helpful beginning with no higher than a 70 percent level of cocoa mass (Calixto-Cotos, Chire-Fajardo, and Orihuela-Rivera 2018). Antioxidant research using chocolate in 2021 was comparatively new, but a centuries-old conundrum still existed: calories. It may have many nutrients, but a 100-gram (3.5 oz.) bar of dark chocolate also contains about 604 calories.

One added benefit: antioxidants help preserve chocolate. As they are mainly found in dark chocolate, that product will keep longest. Milk chocolate keeps somewhat longer than white chocolate, which does not contain antioxidants (Beckett 2000).

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Aphorisms

"Look, there's no metaphysics on earth like chocolates."

Fernando Pessoa

Pessoa, one of the last century's well-known Portuguese writers and philosophers, perhaps sums up the nature of hundreds of quotes, sayings, or pithy aphorisms on chocolate. Metaphysics examines the fundamental nature of reality. Many chocolate sayings compare that reality to the familiar food and its importance to the affairs of daily life.

"There is nothing better than a friends, unless it is a friend with chocolate."

Linda Grayson

"Chocolate says 'I'm sorry' so much better than words."

Rachel Vincent

"Then she thought bitterly that it would be much easier to resist chocolate if her life were less stressful."

J. K. Rowling

"If there's no chocolate in heaven, I'm not going."

Jane Seabrook

"As long as there is chocolate, there will be happiness."

Wayne Gerard Trotma

Of the enormous aphorism collections suggesting comparisons of chocolate to life's experiences, probably the single strongest general theme considers chocolate's relationship to love and sex. Chocolate was promoted as a romantic gift beginning with the ascent of the exotic drink among European aristocracy in the mid-1600s. Early French newspapers make numerous references to chocolate served at balls, parties, and receptions; a play review of 1724 explained that the character Arlequin gave Silvia "some tablets of chocolate" to prove his love (*Mer-cure de France* 1724).

The link between chocolate and romance began with an observation at the very beginning of Europe's introduction to the beverage: chocolate enhances sexual potency. As a witness to an elaborate 1520 feast that Montezuma offered to Spanish conquerors, Bernal Dias des Castillo apparently became the originator of a persistent rumor by reporting that Montezuma drank chocolate before visiting his wives. The story is apocryphal, but chocolate as an aphrodisiac became a favorite legend that has come down to us today. Physicians and researchers throughout the centuries have examined chocolate's ability as a love potion. Little scientific evidence can be found to support the claim. Nevertheless, chocolate's presumed sexual marvels remain part of many aphorisms that compare chocolate and sex.

"The taste of chocolate is a sensual pleasure in itself, existing in the same world as sex. . . . For myself, I can enjoy the wicked pleasure of chocolate . . . entirely by myself. Furtiveness makes it better."

Ruth Westheimer

"Chocolate's better than sex any day."

Cherise Sinclair

Chocolate's nearly eternal relationship to romance and all that leads to it probably encouraged Cadbury, the British chocolate manufacturer, to launch its chocolate bonbons around Valentine's Day in 1868. It was supposedly the way to a woman's heart, and to emphasize that, Cadbury sold the sweets in Valentine-shaped boxes. In the United States, Stephen Whitman in 1912 introduced boxes of Whitman's chocolate as romantic gifts, stocked mostly in pharmacies (Jones n.d.). But aphorisms often reflect a world-weary, slightly cynical view of love or sex, suggesting that the better choice, really, is chocolate.

"Don't wreck a sublime chocolate experience by feeling guilty. Chocolate isn't like premarital sex. It will not make you pregnant. And it always feels good."

Lora Brody

"There is nothing better than a friend, unless it is a friend with chocolate."

Linda Grayson

"Chocolate says 'I'm sorry' so much better than words."

Rachel Vincent

Probably the most famous quote about chocolate in recent history reflects the ironic nature of affection:

"All you need is love. But a little chocolate now and then doesn't hurt."

Charles M. Schulz

Chocolate's centuries-old association with romance and sex made it an obvious choice in nineteenth-century advertising. At the same time, paradoxically, widespread advertising campaigns also linked chocolate to innocence and purity as depicted by children. But the innocence theme of advertising has seldom found reflection in common aphorisms about chocolate. Instead, a second common theme of chocolate sayings emphasizes the almost compulsive and guilty pleasure of eating chocolate, a veritable addiction.

"Your hand and your mouth agreed many years ago that, as far as chocolate is concerned, there is no need to involve your brain."

Dave Barry

"It was like having a box of chocolates shut in the bedroom drawer. Until the box was empty it occupied the mind too much."

Graham Greene

"It is said—not exclusively by people with eating disorders—that food is a drug. Who doesn't feel better when given chocolate at the end of a miserable day? To your brain, real chocolate mimics love. (For all its miracle, the brain subsists on illusions as much as it does much of the fat you eat. Chocolate supplies both.)"

Thom Quackenbush

"Some people smoked crack in alleyways. Franny ate chocolate. On the scale of things, it seemed entirely reasonable."

Emma Straub

Some aphorisms combine the presumed addiction of chocolate with the addiction of sex:

"He craved sex and chocolate. Chocolate was his heroin. Men were his needle."

Tom Cardamone

The presumption that chocolate is irresistible runs through many of these sayings.

"Chocolate is like my best friend and the most intense pleasure at the same time, perhaps not the most intense, but the most regular and reliable one."

Chloe Doutre-Roussel

"Nothing is as alluring as a piece of chocolate you can't have."

Nina Sandman

"True strength is when you can break a bar of chocolate into four pieces with your bare hands—then just eat one."

Judith Viorst

The idea that chocolate could be addictive also takes us back to the earliest days of the Spanish conquest. Writing in 1648, English cleric Thomas Gage related a tale suggesting women in Chiapas, Mexico, so loved their chocolate that they drank it during Catholic Mass. In response to the bishop's forbidding the practice, a maid supposedly arranged for the bishop's poisoning (Gage [1648] 1677). Hence, concluded Gage in an aphorism that has come down through the centuries: "Beware the chocolate of Chiapas."

Research has tended to discount the popular idea that chocolate can be an addiction. It may be just a carbohydrate or sugar craving (Squicciarini and

Swinnen 2016). A 2018 survey reported 50 percent of women in the United States craved chocolate (*USA Today* 2018). Aphorisms that reference this craving tend to presume those who have such a need are women.

"I'm grateful for every day I'm still alive. Everything is still working. I attribute it to eating a lot of processed foods. I think it's the preservatives that keep me going. That, and I eat as much chocolate as I can get my hands on."

Joan Rivers

"What you see before you, my friend, is the result of a lifetime of chocolate."

Katharine Hepburn

"After about 20 years of marriage, I'm finally starting to scratch the surface of that one [what women want]. And I think the answer lies somewhere between conversation and chocolate."

Mel Gibson

"Also, vampires don't eat food. You never get to eat chocolate again. Ever. I'd rather die."

Sarah Rees Brennan

"Man cannot live on chocolate . . . but women can."

Barry Hannah

The idea of associating women with chocolate as an effeminate addiction, and so not appropriate for men, goes back at least to George Bernard Shaw's 1894 comedy *Arms and the Man*. The soldier character who craves chocolate is dismissively regarded by the female protagonist as a "chocolate cream soldier" (see **Chocolate Soldier**). From this comes Shaw's contribution to the list of famous chocolate aphorisms:

"What use are cartridges in battle? I always carry chocolate instead."

George Bernard Shaw

Few quotes about chocolate indicate anything less than happiness giving way to rapture at its consumption. But not everyone agrees with the frankly sexist idea that women crave chocolate but men don't.

"Women have a special relationship with chocolate mostly because our culture tells them to. It goes back to the old claptrap about sweet treats being for 'ladies,' while savory tastes for men."

Bee Wilson

Of aphorisms that actually disparage chocolate we find very few:

"Screw chocolate. A good steak is where it's at."

A. D. Posey

Most of those who have talked about chocolate would be shocked:

"Will looked horrified. 'What kind of monster could possibly hate chocolate?'"

Cassandra Clare

The bittersweet nature of chocolate offers a basis for similar bittersweet metaphors about life:

"Nice memories are like chocolate; you can't survive on them alone. as they aren't very filling, but they make life sweeter."

Janine Weger

"Happiness. Simple as a glass of chocolate or tortuous as the heart. Bitter. Sweet. Alive."

Joanne Harris

Among the most famous chocolate aphorisms in 2021 included, as noted earlier, the quote by cartoonist Charles Schulz. Most contemporary Americans today would perhaps be as likely to recognize this line from the 1994 movie *Forrest Gump*:

"Life is like a box of chocolates. You never know what you're gonna get."

Tom Hanks as Forrest Gump

Other aphorisms in the pantheon of fame:

"What is health? It's chocolate!"

Jean-Anthelme Brillat-Savarin

"Exercise is a dirty word. . . . Every time I hear it, I wash my mouth out with chocolate."

Charles M. Schulz

"The greatest tragedies were written by the Greeks and Shakespeare . . . neither knew chocolate."

Sandra Boynton

"Venice is like eating an entire box of chocolate liqueurs in one go."

Truman Capote

"Chocolate is a serious thing."

Marina Sirtis as *Star Trek* character Deanna Troi

"The superiority of chocolate both for health and nourishment will soon give it the same preference over tea and coffee in America which it has in Spain."

Thomas Jefferson

Jefferson, who along with other Founding Fathers served generous amounts of chocolate for breakfast, seems to have been wrong about chocolate, but right about society's continuing affection for it.

"Chocolate . . . is not something you can take or leave, something you like only moderately. You don't like chocolate. You don't even love chocolate. Chocolate is something you have an affair with."

Geneen Roth

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Aphrodisiac

Chocolate as a substance and as a symbol has been linked to romance and sexual interest since its introduction to the Spanish in 1520. As a romantic gift, chocolate became part of courtship routines as early as 1700s France. A play review in a French newspaper published in 1724 indicated that to prove his love, the character Arlequin gave the character Silvia "some tablets of chocolate" (*Mercure de France* 1724). In 1727, actors parodied an opera scene that included a story about chocolate to seal a couple's love:

We have signed their contract
In these beautiful retreats;
Both of them took chocolate
On the bench where you are.

(*Mercure de France* 1727, 2955)

Taking advantage of the growing tradition of chocolate gifts for romantic couples, Cadbury, a large British chocolate manufacturer, in 1868 offered the world its first Valentine's Day candy box. In the United States, longtime chocolate company Whitman's Candies in 1912 picked up on the idea of romance with its first Whitman's Sampler, selling mostly in drugstores. By 1915, the Sampler had become the country's top-selling box of chocolates (Russell Stover n.d.). In 2014, for Valentine's Day Americans spent about \$1.7 billion on chocolate, some 48 million pounds (21.8 million kilos); however, Americans buy some 90 million pounds around Halloween (Schmitz 2010; Lehnardt 2016).

Romance today certainly plays a large role in chocolate consumption, but that symbolism was not an attraction of cocoa at its world unveiling. Apparently, the Spanish conquerors were interested in sex. Some historians of the Spanish conquest period suggested that the Spanish were obsessed with the hope of finding aphrodisiacs, along with supposedly something to sooth their chronic constipation from an all-meat-no-veggies diet (Coe and Coe 1996). It may have been the basis for a legend apparently kindled by Bernal Dias del Castillo, one of the original soldiers who accompanied Hernán Cortés in the Aztec conquest of the early 1500s. His chronicle of those experiences included an eyewitness account (or so he claimed) of Montezuma taking chocolate, "in a cup of pure gold, a drink made

from the cacao-plant, which they said he took before visiting his wives” (Grivetti and Shapiro 2009, 24).

Although no European chronicler of that period is documented to have actually witnessed Montezuma’s love life, the legend stuck, and throughout its history chocolate has been esteemed, or condemned, as an aphrodisiac. Friar Bernardino de Sahagún in an early compilation of native practices documented a long list of health problems that could be treated with chocolate, including the claim that it was an aphrodisiac. In an extensive examination of the qualities of cocoa, English physician Henry Stubbe in 1662 wrote, “as far as Venery is but the collection and ejection of a superfluity gathered in, and about the testicles: without doubt physicians cannot decline to recommend it.” The researching doctor admitted some embarrassment in writing about something so intimate: “I know many will be apt to censure this discourse, as tending to sensuality, and the upholding [of] carnal lusts and desires: but I suppose the more prudent will acquit me from any such imputation; since that is not the use, but abuse of chocolate” (Stubbe 1662, 142).

Stubbe knew more than a little about the reputation of chocolate to enhance bedroom frolic. As the physician for English king Charles II, he regularly prepared the monarch’s chocolate flavored with vanilla. The king grew to appreciate the beverage’s purported ability to increase sexual stamina. Charles apparently required that assistance; documents chronicle that he ruled the kingdom as the very definition of a womanizer. He is described as keeping at least two mistresses while regularly engaging in one-night flings with women who came to him through a palace backstairs. The account that informs us of this also indicates that by 1669 he was spending £229 10s. 8d. a year for chocolate, an enormous sum for the time (Barnes 2006). Apparently, the king was persuaded by English writers such as James Wadsworth, who said of chocolate famously in 1652: “Twill make old women young and fresh, Create new motions of the flesh. And cause them long for you-know-what, If they but taste of chocolate” (quoted in Hospodar 2004, 87). Chocolate was still too expensive for anyone beyond the British elite, however.

Not everyone of that century was as enthusiastic about chocolate’s purported love powers. Condemnations of promoting “venery” dogged chocolate’s reputation among the more religious who decried its use for the very same legendary power found by those who esteemed it. Theologians warned that it should be banned before the Catholic fast as morally dangerous. Concern among some more puritanical British by the early 1700s was that, as an aphrodisiac associated with Spanish Catholics, it betrayed a lifestyle of decadence. Vain and “lustly women” supposedly favored a bedside morning chocolate habit (Loveman 2013).

Chocolate’s legendary reputation was encouraged in the eighteenth century by some of the most illustrious and nefarious. Carl Linnaeus himself, the botanist who named *Theobroma cacao*, noted the beverage could be therapy for numerous vexations including sexual ones. The famous eighteenth-century Venetian Giacomo Casanova purportedly called chocolate “the elixir of love” (Koehler 2017). The eighteenth-century French erotic author Marquis de Sade wrote that he and others took chocolate before an orgy, although today we think he made up a lot of

his more outrageous sexual descriptions. He spent time in prison for his writing, however, and certainly was known to love chocolate, as in prison he regularly requested it and complained if its quality was not up to his standards (Coe and Coe 1996; Squicciarini and Swinnen 2016; Brown 1985).

By the nineteenth century, chocolate was soaring in popularity as an everyday indulgence but losing ground as a cure for much of anything. While a few late-1800s health texts still were repeating the legend, most chocolate lovers clung to few illusions regarding the love-potion possibilities of cocoa. Chocolate, in fact, was thought not to do much good for health at all. Great snack, though. End of story.

But not so fast. In the later twentieth century, researchers took a serious new look at chocolate, including the possibility that it really was an aphrodisiac. They found that not only did chocolate have fiber, iron, manganese, magnesium, copper, flavonoids, and even a little protein but also phenylethylamine (PEA). This substance is part of chocolate's theobromine, a caffeine-like alkaloid known to increase feelings of alertness and fight depression. We produce PEA, sometimes nicknamed the "love drug," ourselves during euphoric moments that may occur during an intimate episode. So does the PEA found in chocolate actually help us out in that department? No evidence yet, but probably not.

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Arriba Chocolate

See Nacional Chocolate

Aztecs (Mexica)

We credit the Aztec Empire for introducing the world to chocolate through the Spanish conquest of 1521. But the Spanish never called the conquered native peoples Aztecs. Those Spaniards who wrote the first histories of the period called the subjects Mexica. For another two centuries that was the accepted reference to those who came from what became the Basin, or the Valley of Mexico, that today comprises Mexico City and the surrounding area.

Historians trace the first reference to Aztecs to the 1700s. A 1780 Aztec history brought the term to more common usage, and the publication of *History of the Conquest of Mexico* by William H. Prescott in 1843 brought the reference to general world acceptance (Maestri 2018; Prescott [1843] 1904). So while today we generally understand Aztec as referring to the great empire that dominated much of present-day Mexico and revered chocolate, the reference is not quite accurate, and some history refers to the group still as Mexica. But that also is not quite accurate. The native tribe of Azteca controlled an area of today's central Mexico about twice as large as today's New England states, with a wide variety of climates. It was ruled from the capital of Tenochtitlán, on the site of today's Mexico City. But the Azteca tribe did not come originally from this part of modern Mexico (Maestri 2018).

According to legend, the Azteca were nomadic until they connected with other wandering tribes in a settlement called *Teo Culhuacan* (Old Culhuacan) (Barlow 1945). A god figure of Huitzilopochtli, also called Mexi, from this period told the Aztecs, as the “chosen people,” they must continue alone and change their name from Azteca to Mexica. Archeology supports the story that the tribes left northern Mexico for central Mexico about the 1100s–1200s. Should therefore, the empire be called Mexica? It is unclear, as the term comprises many ethnic groups, often naming themselves after the town of origin. Those from Tenochca and Tenochtitlán, together as the main forces that became the empire, called themselves Mexica. Mexica from 1428 were leaders of the empire that ruled over ancient Mexico. But founding tribes of Mexica included Aztecs and other tribes. Today the force of common usage veers toward the term “Aztec,” even if the history is complex. But the rulers of the empire that faced the Spanish conquest did share one influence from the many Mesoamerican civilizations that through the centuries had risen and fallen: a preoccupation with the fruit of the cacao tree.

The Aztec religion began with a legend of cacao as a gift of the god Quetzalcoatl (plumed serpent), who discovered it on a mountain (Dillinger et al. 2000). The divine story along with cocoa's rarity turned the bean and chocolate into a central focus of pre-Columbian Aztec culture. The Aztecs could not grow their own cacao in central Mexico, as the tree grows only in a band 20° N and 20° S of the equator. They had to import the beans. When a commodity is rare, it becomes

political, and cacao as a special food was claimed by the Aztec royalty and elite. Its use was codified as religiously symbolic and valuable, the beans sometimes serving as money (Meanany and Murata 2007).

To fill their need, in the 1400s Aztec warriors conquered cacao-producing regions in the south Pacific coast, primarily Soconusco. Aztec elites established a vast operation to import huge quantities primarily from beans harvested in the ideal cacao climate of Soconusco (part of today's state of Chiapas). As pack animals or wheeled carts were unknown in pre-Columbian Mesoamerica, the Aztecs relied on a web of trails between the cacao-producing regions and Tenochtitlán, serviced by traders who carried sacks of 24,000 beans weighing 50–60 pounds (120 kilos) on their backs over the rough passages. At the time of conquest, Soconusco natives tended 1.5 million cacao trees. Documentation on the extent of tribute they paid to the Aztecs differs. Some evidence shows a tribute of 200 sacks of 24,000 beans each (Presilla 2009). Others show a much higher level, 960 sacks (called *carga* by the Spanish) a year. It may have tended toward the higher number, if we can believe Spanish observers who wrote that Montezuma's cacao stores contained 960 million beans. Women were charged with the laborious task of transforming beans into beverage.

The enormous amount of manpower needed to transport this quantity of cocoa beans to Tenochtitlán gives us some idea of their importance to Aztec culture not only as a drink of the elites and sustenance for the soldiers but also for celebrations, rites of passage, money, and most grimly, in the religious sacrifice ritual. Bernardino Sahagún (1577) observed that commoners who drank cocoa without permission could be executed, but relationship of cocoa and death in the Aztec culture extends beyond common laws. Cacao became a regular part of tribute to Aztec gods; one source indicated priests pierced their earlobes and covered the cacao with the blood as sacrifice. Another indicated that cocoa was served to victims intended for sacrifice. These were normally captured enemies or slaves sold in the market. Recent archeological evidence supports the Spanish claim that women and children were included (Wade 2018). The cocoa was apparently intended to serve as a calming aid or possibly to leave the victim unconscious. Some Spanish observers wrote that the cocoa was mixed with blood of other victims collected from the water used to clean off their sharp obsidian knife blades. The association of cocoa with blood ran through Aztec rituals, probably also influencing the favored addition of annatto to chocolate to turn the beverage red. In the Aztec cosmic diagram, cacao was depicted as the tree of the south, toward death, and associated with the color of blood. The pod symbolized the human heart torn out in ritual sacrifice, possibly because they both held sacred liquids, blood or chocolate (Dillinger et al. 2000; McNeil 2006).

The Spanish who witnessed this sacrifice ritual wrote of their horror as they saw beating hearts of live victims ripped from chests, part of a religion that demanded daily sacrifice to guarantee the sun would return at dawn. The claim of Spanish soldiers that they saw a rack of skulls containing an astounding 130,000 victims has been open to historical skepticism. The Spanish writers were obviously biased. Conquerors used the grim ritual as an excuse to war against the Aztecs

and to end the empire that they called barbaric. However, recent archaeological research has found that certainly racks held thousands of skulls, and that the Aztec practice of human sacrifice far eclipsed any other in the world (Wade 2018).

The bloody rituals, and the cruelty of Aztec slavery and wars over cacao, from the beginning introduced the world to a violent story of chocolate. That often-sordid story would not change through most of cacao history. The Spanish conquest may have ended the Aztec Empire, but it did not end the greed, brutality, slavery, and violence associated with the cocoa bean. Spanish conquerors saw the value of cocoa and so absorbed the cruel Aztec system of tribute, the Spanish requiring ever-higher production from brutally coerced Soconusco natives to meet the demand in Mesoamerica and in Spain. Finally, the region could no longer comply. Forced labor and disease had reduced the native population by up to 95 percent. The Spanish responded by extending production to nearby Guatemala, but by the 1600s the original Aztec cacao sources were exhausted and production moved to Ecuador and Venezuela.

What happened to the Aztec culture? Spanish settlers took up many native customs such as cocoa and maize, while natives absorbed Spanish customs like wheat and cattle. Colonists took up natives as their servants or concubines, as they far outnumbered the Spanish. The less rich settlers married native women, who brought Indigenous culture to the households and their children. Women traditionally also processed cocoa (Norton 2006).

By the end of the century, the two cultures had become creolized and so a new Mexican culture had emerged. The Spanish in the Old World began to show condescension and disdain for the emerging culture. The Aztecs were gone.

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B

Badianus Manuscript

By the time Columbus arrived in the New World, American natives had for centuries revered chocolate not only as a ceremonial symbol and satisfying drink but also as a source of good health and treatment for disease. Spanish missionary Bernardino de Sahagún's twelve-volume 1577 New World social history (The "Florentine Codex") included an extensive discussion of chocolate in Aztec society, with medicinal properties. But the Badianus manuscript of 1552 is notable as it was the first solely concerned with medicinal properties of native plants (called a "herbal") and because it was produced by natives themselves.

Two native Aztecs at the College of Santa Cruz, Tlaltelulco, today part of southeast Mexico, compiled descriptions and color plates of 183 plants. It was probably the work of native physician Martín de la Cruz, who wrote in Nahuatl, a native Aztec language. It was translated into Latin by Johannes Badianus, whose name rather unjustly provided the reference for the manuscript that historians know today. The herbal was dedicated to Don Francisco de Mendoza and his father, Don Antonio de Mendoza, first viceroy of Mexico. The indication is that it was intended as a gift to King Charles V of Spain, but we do not know if he ever read it (Zirkle 1941; WRF n.d.).

Apparently, it ended up in the library of a pharmacist named Didacus Cortavila, as his name is written on the title page, and it was translated into Italian in the 1600s. That only surviving copy is in the Royal Library of Windsor (Zirkle 1941).

Today we rely on the manuscript as the earliest reference for native medicinal use of chocolate. It included no reference to European traditions or evidence of their influence. And its importance is recent. Early European references to chocolate's medicinal properties do not mention the Badianus Manuscript. We presume it was unknown to physicians or scientists for more than 350 years. The original ended up in the Vatican Library, discovered in 1929 by Charles Upson Clark and reprinted in 1941 (WRF n.d.).

De la Cruz recorded native health and medicinal uses of chocolate as a treatment for problems including angina, constipation, dental health (tartar removal), dysentery, indigestion, fatigue, gout, heart ("overheated"), hemorrhoids, and lactation problems. Cacao tree flowers were recommended in a perfumed bath to cure fatigue, suggested especially for government administrators.

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Baker's Chocolate, USA

What is apparently the world's first branded chocolate began in colonial America in 1765. John Hannon, an Irish chocolate maker, acquired a cocoa mill in Dorchester, Massachusetts, to claim his share of a burgeoning market for chocolate. While the precise business relationship between Hannon and Walter Baker remains uncertain, it appears that Baker helped to finance Hannon's mill. Baker graduated from Harvard in 1760, at first intending to be a minister, then a doctor, but finally settling on a career as a merchant (Bostonian Society 2005). In 1779, however, Hannon disappeared during a sea voyage. Historians are not sure where. One legend contended that he hoped to get out of a bad marriage by escaping back to Ireland. Another suggested that he sailed to the Caribbean to buy cocoa beans. A third combines the two—that he told his wife he was going to buy cocoa beans when actually he hopped a ship to Ireland. We do know this: he was never heard from again (Bostonian Society 2005; Dorchester Atheneum 2008).

His (possible) widow Elizabeth tried unsuccessfully to continue the chocolate operation. In 1780, Walter Baker bought out her stake in the company. While Baker had been part of the business since the beginning, the Baker's chocolate name did not appear on products until after 1780. It has become one of the oldest brands of any kind, and the earliest chocolate brand still in existence today. Hannon and Baker were not, however, the first to produce chocolate in the colonies. By the eighteenth century, the attractive confection/medicine had become so popular that seventy chocolate operations existed, one-third of them in Philadelphia (Grivetti and Shapiro 2009).

Under son Edmund Baker, the business survived economic challenges of the War of 1812 to expand trade beyond the Boston area, as far as New Orleans and Canada. New products included homeopathic chocolate, French chocolate, Spanish chocolate, and Caracas chocolate. In 1849, it jumped on the California Gold Rush, not to find the precious metal itself, but to find gold through the business of selling chocolate in San Francisco. In doing that it competed with the second-oldest American chocolate brand still in existence, Ghirardelli. But Baker's chocolate became much more familiar to nineteenth-century Americans. Efforts of Edmund, and after 1823 his son, also Walter, to persuade Americans that chocolate should not be a luxury, but an everyday food, were so successful that for much of the century Baker's Chocolate was a household name that dominated chocolate sales in North America (Grivetti and Shapiro 2009; Land 1999).

Large chocolate operations in Europe and the United States aggressively marketed products as wholesome selections for women, children, or families. Baker's response was to direct its advertising at homemakers and to promote at World's Fairs and expositions. The company won a silver medal at the 1867 Paris Exposition, a step to worldwide exposure for the brand (Bostonian Society 2005).

Henry J. Pierce, step-nephew of Walter, took over the company in 1854, but retained the name as Walter Baker & Co. Legend tells us that on a visit to a Dresden, Germany, museum, he was attracted to a pastel painting entitled *La Belle Chocolatière* painted between 1743 and 1745 by Swiss artist Jean-Étienne Liotard. In 1877, the image became Baker's iconic trademark. The woman depicted was apparently Anna Balthauf, a Viennese chocolate server. Daughter of an impoverished

knight, she supposedly enchanted cocoa lover and Austrian nobleman Prince Dietrichstein, who proposed marriage and commissioned Liotard to produce a portrait as a wedding gift (Bakepedia n.d.; Broekel 1985). While evidence of this tale's veracity is a bit flimsy, historians believe it is probably accurate, basically. The image was still part of Baker's packaging in 2021, though reduced to a small icon.

Baker's became ensnared in the growing nineteenth-century controversy over slave labor used to harvest cacao in the colonies of Brazil and the Chocolate Islands of São Tomé and Príncipe. By the 1840s, Baker's was promoting its "free-labor chocolate." Early on, Baker's cut off imports from the Portuguese-controlled islands that later became a scandal of British chocolate giant Cadbury. However, the U.S. company did continue to import some cocoa from Brazil, a former Portuguese colony that produced cocoa with slave labor until abolition in 1888 (Higgs 2012; Grivetti and Shapiro 2009).

In 1895, Pierce retired and the family-owned company became a publicly traded corporation. At the century's turn, it faced its first real domestic competition from an upstart, Milton Hershey. The former maker of caramel snared Walter Baker Co. employees to help him establish a chocolate operation in Pennsylvania. Baker accused Hershey in 1900 of spying to acquire its chocolate techniques. But Hershey persevered, and today has replaced Baker as America's most iconic brand of chocolate. Baker was acquired by Postum Cereal Co. in 1927, renamed General Mills two years later. It became part of Kraft Foods in 1988, in 2015 becoming Kraft Heinz.

In the 1940s, Baker marketed several varieties of snack candy bars, including Flying Fortress. The bar was based on chocolate rations it produced for the military during World War II (Broekel 1985). Baker no longer produces snack candy, but in 2021 the brand still featured a familiar variety including unsweetened,

Timely Warning.



The great success of the chocolate preparations of the house of **WALTER BAKER & CO.** (established in 1780) has led to the placing on the market many misleading and unscrupulous imitations of their name, labels, and wrappers.

Walter Baker & Co. are the oldest and largest manufacturers of pure and high-grade Cocos and Chocolates on this continent. No chemicals are used in their manufactures.

Consumers should ask for, and be sure that they get, the genuine Walter Baker & Co.'s goods.

WALTER BAKER & CO., Limited,
DORCHESTER, MASS.

Walter Baker launched the first branded chocolate company in 1765 near Boston. By the nineteenth century Walter Baker & Co. had become the largest chocolate manufacturer in North America. This advertisement from *Harper's Bazaar* magazine dated Thanksgiving 1895 features the Baker trademark, "The Chocolate Girl." It is based on a pastel by Jean-Etienne Liotard painted about 1744, and currently displayed at the Staatliche Kunstsammlungen in Dresden, Germany. (Library of Congress)

bittersweet, semisweet, German sweet, dipping chocolate, cocoa powder (not Dutched), and white chocolate (Kraft Heinz n.d.). The chocolate today is mostly sold in American grocery stores for home baking.

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Bean, Cocoa

The dry, brownish, almond-sized beans that end up as your chocolate bar or hot chocolate show little potential for anything good in their raw form. In fact, the white mucilage pulp that surrounds them in the pod looks a lot more promising. Cacao pulp tastes sweet scooped right out of the split-open pod, just as you can spoon coconut right out of its hard shell. Cacao pulp quickly begins to ferment in the tropical climate where cacao trees grow. It probably formed the base of *chicha*, an ancient beer-like drink still made from a variety of recipes in some parts of the Americas. But cacao pods also contain these vexing seeds that early natives did not appreciate. They tasted revolting, with no apparent nutritional quality.

Somewhere at the dawn of American prehistory, however, apparently someone by accident or experiment tried roasting a few seeds that had lain around for a bit and fermented. Fermenting killed viability: this is how we define the difference between a seed and a bean. At the beginning, a cacao seed comprises two cotyledons. Along with that we have a tiny embryo (germ) and a food store for the little thing—cocoa butter. Alas, the seed has little hope of germinating, as fermentation produces heat that kills it. But we do not need to feel too sad, as the same fermentation produces a variety of changes that develop something early natives could not have guessed—cocoa! While the word "cocoa" can be applied in a variety of ways to the product of *Theobroma cacao*, the botanical name for cacao tree, many sources call the product "cacao" until after it is fermented, when it becomes cocoa. Cocoa beans are processed to become cocoa or chocolate, which could refer to the solid or liquid form. The worldwide industry refers to itself as the cocoa sector.

Each cacao pod is between 100 and 350 millimeters long (4 to 14 in.), weighing from 200 grams to 1 kilo (7 oz. to 2.2 lb.). In fermentation, the pulp falls away from

the thirty to fifty reddish-brown seeds in each pod. The fermented bean must be dried, then roasted before further processing. Roasting enhances the cocoa flavor and eliminates possible biological threats, notably salmonella. Normally the shell is removed after roasting, as it becomes brittle and easy to winnow. Cacao trees yield about 5–6 pounds (2–3 kilos) of dried cocoa beans a year. About four hundred beans are needed for one pound of chocolate (Cargill 2021; Gordon 2007).

The roasted bean is broken into its nibs and ground. Traditionally, the grinding was done on a heated and curved stone, called a *metate*, but grinding machines replaced this labor-intensive process in the nineteenth century. Today we may see the obsolete hand-grinding process in a few rural areas of Mesoamerica or in museum demonstrations. Unlike some dry beans, such as coffee, grinding cocoa beans produces so much fat that it turns to a gritty paste. The fat is cocoa butter, generally about 50 percent of the bean. A press often extracts the cocoa butter from the ground bean to leave a powder with about 12–20 percent fat. Some manufacturers produce chocolate bars by returning some of the fat. Cocoa butter only, with no cocoa solids, can be combined with sugar and milk powder to produce white chocolate, a popular confection that does not actually taste like chocolate. Otherwise, cocoa butter is sold for cosmetics. In early days, it was a popular remedy for hemorrhoids (Thompson 2015).

After roasting but before grinding, some cocoa nibs are processed with an alkali to tame their bitterness, encourage easier mixing with water, and darken the color. The process, called Dutching, was invented in Holland in the nineteenth century.

The United Nations Food and Agriculture Organization (FAO) in 2020 offered a guide detailing a recommended cacao-farming process:

- Pick only ripe pods, yellow or red. Cut the pod off with a machete, as pulling them off will damage the tree.
- The pods can be opened by hitting with a thick piece of wood. Do not wait longer than four days to open.



Cocoa beans begin as seeds from a cacao pod as shown above. The pod, roughly the shape of an American football, contains about 50 seeds surrounded by a thick white pulp. During fermentation the pulp drains away and the seeds, no longer viable, became cocoa beans ready for further processing. (Ataly123/Dreamstime.com)

- Remove the beans into a basket and carry them to the fermentation area.
- The broken husks can be used for compost.
- The seeds are usually fermented in heaps under banana leaves, but it is better to ferment them in boxes. Fermentation takes from six to ten days.
- The beans are then dried, usually in the sun, for five to ten days. In wet climates, they may be dried by spreading the beans on a concrete slab and starting a fire underneath.
- The beans are sorted to remove moldy, broken, germinated, or flat beans. (FAO n.d.)

Cocoa beans are shipped to ports in burlap bags weighing 130–200 pounds (60–90 kilos), where they are graded for quality based on the “cut test.” Samples of three hundred beans are cut lengthwise for examination. Defects include moldy, slaty, insect-damaged, germinated, or flat and hard-to-shell beans (ICCO 2012). Slaty means the beans were not fermented and so have a gray color. A violet cut indicates the color of insufficient fermentation. A brown cut indicates the color of adequate fermentation. Smoky or “hammy” smells indicate too much fermentation or drying over a fire. While sometimes chocolate is labeled “organic,” most African cocoa beans (two-thirds of world production) are organic, whether or not they are labeled as such, because expensive pesticides are seldom part of the smallholder cacao farmer’s arsenal (Schmitz 2010).

The price of cocoa beans on the world commodity market cocoa sector is set per metric ton, 1,000 kilos, 2,205 pounds. It fluctuates widely based on weather, crop health, political stability, demand, and amount stored in European warehouses. In June 2016, it peaked at \$3,122. By December 2017, it had plummeted to \$1,918. In July 2020, it was below \$2,000, the drop was blamed on lower demand due to the COVID-19 pandemic. By June 2021, it was \$2,389 (ICCO 2021; GhanaWeb 2020; Lawrance and Roberts 2019; Statista 2021; Leissle 2018).

With an estimated 40–50 million people relying on the cocoa sector to make a living, high-producing countries have tried to modulate price volatility by setting a floor price, but success has been limited. In 2020, Ivory Coast and Ghana were the world’s number one and number two producers of cocoa beans with about 60 percent of total production. Third was Indonesia; fourth, Nigeria. Other top-producing cocoa countries were Uganda, Cameroon, Togo, Papua New Guinea, Brazil, Venezuela, Peru, Ecuador, Columbia, Dominican Republic, and Mexico (Voora, Bermúdez, and Larrea 2019; World Population Review 2020).

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Beverages

Many of us can think of a variety of drinks made with chocolate, both alcoholic and not. Native peoples in pre-Columbian Mesoamerica also served a variety of drinks made from cacao, both the pulp and the bean. Archaeological evidence shows earliest beverages were not based on cocoa beans but on the pulp that surrounds them in the pod. The thick and sweet white substance naturally ferments in tropical climates. It can be converted to an alcoholic drink that Americans today call *chicha*. Evidence shows nonalcoholic drinks also were produced. Friar Bernardino de Sahagún in his descriptions of Mesoamerican cacao published in 1577 described a number of beverages based on the pod, including this drink as well as cocoa. Archaeologists believe the pulp-based beverage predated the bean-based drinks (Sahagún 1577; McNeil 2006).

Most familiar cacao-based drinks, however, rely on fermented, roasted, and ground cocoa beans mixed with a wide variety of other substances. For centuries, chocolate was almost exclusively a beverage. While it could be formed into greasy, gritty cakes for storage, the cakes were nearly universally scraped into cups or pots. In early preparations, water (cold preferred by Aztecs, hot preferred by Maya) would be added, and the resulting liquid would be poured from cup to cup to keep solids in suspension and to raise a froth the natives found so attractive. Spanish colonists at first disdained both the beverage and the froth, but by the later 1500s, became converts to the drink. They universally added sugar along with

many spices both native and European. The Spanish apparently invented the *molinillo* (a type of twirling whisk) to raise the froth and to whip up the cocoa particles; natural cocoa's high fat content tends to float to the top of the cup. Some European chocolate houses skimmed the fat before serving, although the *molinillo* (also called *molinet*) became a standard part of chocolate pots until the chocolate press and alkalizing process of the 1800s acted as an emulsifier to make the apparatus obsolete (Loveman 2013; Gage [1648] 1677; Chabráñ 2015).

One popular addition in the native world of cocoa was annatto. Called *achiote* in Spanish, it is a spicy dye that turns the beverage red. Sahagún wrote the color symbolized blood as both cacao and blood were precious. Some Europeans disdained annatto, but another common native addition, vanilla, found so much favor that it became a European standard. It still is added to many cocoa products today as a flavor enhancer. Natives did sometimes add honey to cocoa, but sugar did not exist in pre-Columbian America. The Spanish, realizing the commercial value of sugar plantations in the New World, brought not only sugar canes to the Americas but also eventually millions of African slaves to tend them. Sugar quickly became a universal European addition to cocoa, as it tamed a characteristic bitter flavor and served the growing sweet tooth so many people have today. One can buy unsweetened cocoa or chocolate bars, but most consider its bitterness and astringency an acquired taste. It is commonly used for baking.

Other popular flavorings added to cocoa beverages over the centuries included maize (corn), chili peppers (spicy or not), dried flowers, allspice (all from Mesoamerica), cinnamon, nutmeg, anise, mint, black pepper, ambergris, musk, rose or orange water, wine, spirits, eggs, and milk. Many more additions were less palatable, even poisonous (see **Adulteration**) (Albala 2007; De Blégny 1687; Coe and Coe 1996).

Cocoa's introduction to Europe began in strongly Catholic Spain, with a focus on its production and use by Catholic orders. The Jesuit and Dominican orders in particular took great interest in the cocoa trade, but a challenge among Catholics of the time revolved around a centuries-old debate: should cocoa be considered a beverage or a food? The question for Catholics of the era was critical; if cocoa was a drink, its use before Mass would not break the fast. If it was a food, it would. The religion's requirements of the era demanded fasting before receiving the sacrament of Holy Communion during the religious ceremony, but the popular cocoa beverage was commonly enjoyed in the morning before church—or even during the Mass.

The Jesuits, well known for their chocolate affection and for the wealth they gained through its production, argued that a cocoa beverage did not break the fast. Dominicans argued the opposite. By the late 1500s, church leaders and doctors were asked to offer their opinions. Spanish physician Juan de Cárdenas in 1591 argued that chocolate if mixed only with water would not break the fast. But if it were mixed with a variety of other ground foods, it would, because the point of fasting was to “mortify the flesh” (Forrest and Najjaj 2007). As cocoa also was thought to be a medicine, some argued that if used solely as a medicinal beverage it would not break the fast. Italian Cardinal Francesco Brancaccio in 1662 made

that argument, noting that for centuries wine, also a beverage, did not break the fast. He was preceded by Pope Paul V, who declared in 1569 that the beverage could be consumed during Lent. Rumor was that the pope had tasted the beverage unsweetened and found it so disgusting that apparently it would certainly contribute to mortifying the flesh. However, it was Brancaccio's decree that finally settled the matter: cocoa as a beverage did not break the fast (Korten 2017).

If would, of course, if eaten as a solid or thickened by maize into a porridge as was a part of traditional native culture. But consuming a solid bar of chocolate was not feasible until 1847, when the British company Fry & Sons produced a solid product that could be molded into a bar or other shape and consumed anytime as a snack.

Today consumers can enjoy a wide variety of chocolate beverages including, of course, the most common, hot chocolate: cocoa powder mixed with milk, sugar, and for an added punch of sweetness, a marshmallow. Or one can add ice cream and shake for the old American malt shop standby, chocolate milk shake. A drink from steeped cocoa shells became an acceptable substitute for tea or coffee in colonial America, and today we still can find cocoa-based beverages prepared by brewing or steeping nibs or shells in hot water. Chocolate also forms the base for a variety of alcoholic drinks, including chocolate martini, chocolate mudslide, chocolate vodka shots, chocolate orange cocktail, and, in fact, the possibilities are limited only by a bartender's imagination.

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De Blégny, Nicholas

See Dufour, Philippe Sylvestre

Bloom

See Fat Bloom on Chocolate

Body scrub

See Cosmetics

Brillat-Savarin, Jean-Anthelme

See Debauve & Gallais (France)



Cacao, Heirloom

Chocolate conquered the world from cacao trees originally grown in Mesoamerica. The area in which the Spanish first discovered the apple-tree-sized cacao reached from central Mexico down through modern Belize, Guatemala, El Salvador, Honduras, Nicaragua, and northern Costa Rica. In this region, in particular the Soconusco area of today's Pacific-coast Mexican state of Chiapas, the great native civilizations of Aztecs and Maya found their source for the treasure of cocoa.

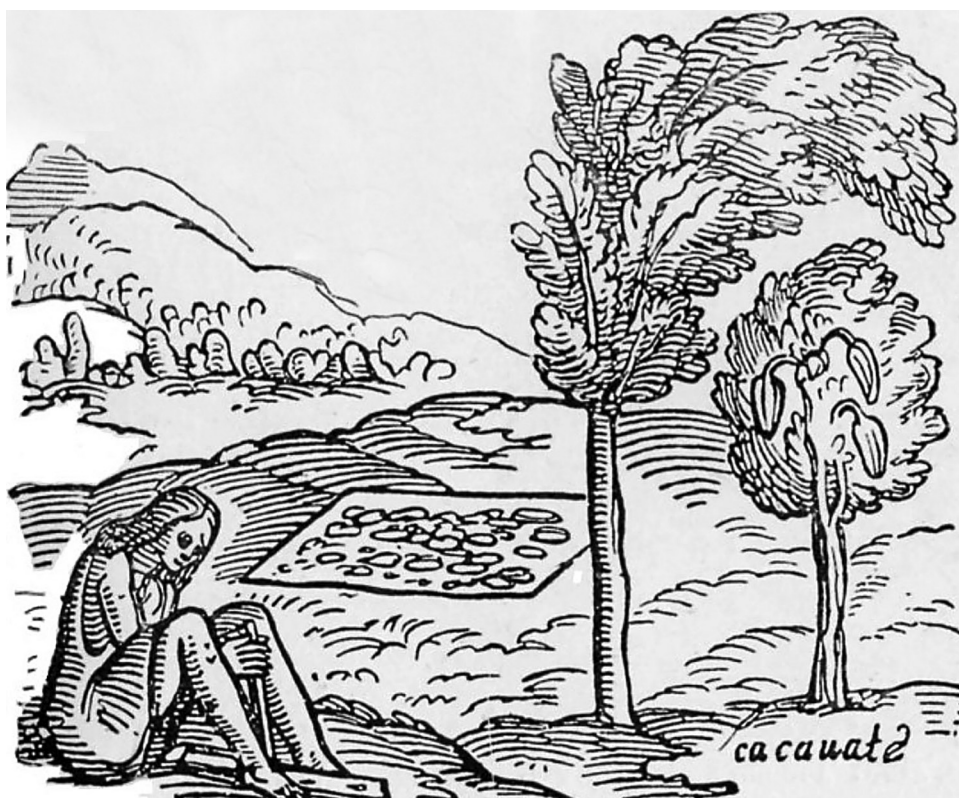
What variety were these cacao trees? The concept of plant taxonomy (a classification system) was unknown to the early natives or Spanish colonists. Cacao was cacao. A pod was a pod. Until a second variety was found.

Spanish explorers to South America noticed wild cacao trees growing in Ecuador, around the coast at Guayaquil. Clearly cacao, but different from the Central American pod they had become accustomed to. It was “foreign,” or *forastero*, unlike Mesoamerican home-born cacao, or *criollo*. These centuries-old separations of cacao into two varieties, *forastero* and *criollo*, hardly changed, until the end of the nineteenth century (Frydenborg 2015; Coe and Coe 1996).

A third variety, Trinitario, was an early development on the island of Trinidad near Venezuela. In the early 1700s, a hurricane, and probably a fungus, wiped out the cacao plantations. In mid-century, friars of the Capuchin order tried to reestablish cacao by hybridizing the few *criollos* that were left with *forastero* they had brought from eastern Venezuela. The new cultivated variety (*cultivar*) successfully combined high yield and hardiness. It was named after the island (Presilla 2009; Morris 1882).

But it was not *criollo*. By the eighteenth century, that original variety had grown to become the most valuable cocoa bean on the European market. As the old Central American plantations failed to keep up with burgeoning demand, Venezuelan *criollo*, sold as Caracas cocoa, replaced Soconusco's reputation for top quality. By 1810, half the world's cocoa came from Venezuela. Conversely, the Ecuador variety, *forastero*, did not have a flavor profile favored in Europe and so was considered inferior. It was sold as Guayaquil, a cheaper cocoa.

Throughout the next century, the three old varieties, *criollo*, *forastero*, and Trinitario competed for worldwide tastes. The world's cocoa production became centered in Brazil, Venezuela, and Ecuador. But cacao was moving east from its first home in the Western Hemisphere—across the Atlantic to Africa. Portuguese first introduced it to the small São Tomé and Príncipe islands off the West African coast. British and French colonists by the late 1800s had moved it to the African



The sketch of a cacao tree shaded by a larger tree first appeared in the works of Cornelis Bontekoe (1640–1685) a Belgian physician who promoted the positive health effects of tea, coffee, tobacco, and chocolate. (Knapp, Arthur W. *Cocoa and Chocolate*. London: Chapman and Hall, Ltd., 1920.)

mainland of the Gold Coast (now Ghana) and Ivory Coast. The variety was forastero.

Or was it? In 1880, British botanist Daniel Morris in Jamaica undertook the first serious scientific effort to determine actual varieties of *Theobroma cacao*. The result was published in 1882, *Cacao: How to Grow and How to Cure It*. He noted, “so far, nothing has been done towards giving a systematic and descriptive account of the twelve or thirteen varieties of cacao now under cultivation” (Morris 1882, 11). He observed that cultivation through centuries had yielded many varieties that “deserve more attention than they appear to have received.” Morris surveyed known cacao varieties in Trinidad, Grenada, and Jamaica, along with the “celebrated Caracas variety from Venezuela.” He separated the varieties into two what he called “great classes” under their traditional names, criollo and forastero. Criollo was a single category. Under forastero, Morris (1882, 13) specified these varieties:

Var. a and b, Cundeamor, verugoso amarillo (yellow) and colorado (red)

Var. c and d, Liso amarillo (yellow) and colorado (red)

Var. e and f, Amelonado amarillo (yellow) and colorado (red)

Var. g and h, Calabacillo amarillo (yellow) and colorado (red)

Criollo, he wrote, by the 1880s was still grown only in Venezuela, and “its yield, though small, is considered of great value” (Morris 1882, 13). He noted most growers moved to forastero for superior yield and hardiness. He did not list Trinitario as a separate class, but said Trinidad farmers grew forastero. And the variety that moved to Africa? It was called Amelonado.

The Morris classification turned out to confuse more than clarify, and so the three groupings of criollo, forastero, and Trinitario continued for the next century to be nearly universally the accepted cacao groups for producers and manufacturers. In 2008, however, armed with modern tools of analysis, Juan Carlos Motamayor, a geneticist working for Mars, Inc., began from scratch to determine groupings within the general three classes. Motamayor analyzed 952 cacao specimens phylogenetically using DNA sequences. His taxonomy set up ten “genetic clusters,” named mostly for the cacao’s geographic origin. The ten clusters as set out by Motamayor et al. (2008) are:

Marañon	Contamana
Curaray	Amelonado
Criollo	Purús
Iquitos	Nacional
Nanay	Guiana

“This new classification,” he and his research team wrote, “reflects more accurately the genetic diversity now available for breeders, rather than the traditional classification as Criollo, Forastero or Trinitario” (Motamayor et al. 2008, n.p.).

The USDA Agricultural Research Service established its own classification based on Motamayor, but differing slightly: Ucayali/Scavina replaced Contamana; Parinari replaced Marañon; Iquitos Mixed Calabacillo (IMC) replaced Iquitos. It also added another genetic cluster, Boliviano. Growers sometimes lump Ucayali/Scavina, Curaray, IMC, Parinari, Nanay, and Purús as “upper Amazon forastero” and Amelonado as “lower Amazon forastero.” Trinitario was found actually to be a hybrid of Amelonado, upper Amazon forastero and criollo. Criollo, the famous ancient variety first encountered by the Spanish, has today become one of ten genetic groups. “So-called modern Criollos are quite close to ancient Criollos but arise from hybridization,” noted Motamayor et al. (2008, n.p.).

Cacao varieties have become complex as natural and human-initiated hybridization over centuries resulted in countless strains. The question then becomes this: do we really have any heirloom cacao varieties left? The old forastero that moved to Africa in the nineteenth century we now know as Amelonado. It is the workhorse of the bulk cacao industry, and likely what we eat in mass-market chocolate produced by huge multinationals. Criollo chocolate is available from fine-chocolate makers, but it is likely a modern hybrid. It is expensive because it is uncommon, not necessarily because it offers better flavor—though many purists think it does. Trinitario still exists among the fine-chocolate makers, but other cultivars (hybrids produced by intentional cross-breeding) proliferate as breeders

make efforts to find a tree superior in production, easier to grow and resistant to disease. Most familiar is CCN-51. In 2015, it accounted for more than one-third of Ecuador production (Giller 2017). Researchers including Motamayor et al. in 2014 found that CCN-51 comprised 45.4 percent Iquitos, 22.2 percent criollo, 21.5 percent Amelonado, 3.9 percent Contamana, 2.5 percent Purús, 2.1 percent Marañon, and 1.1 percent Nacional (Boza et al. 2014).

CCN-51 is the opposite of heirloom; it has become controversial because it requires more fertilizer and pesticide. But it yields four times more cacao and is resistant to fungal diseases. Some purists described the taste as bitter, dirty, and undesirable. Others argued that with proper roasting its quality can be good.

We have noted that ancient criollo, the heirloom variety, was thought to no longer exist. We do today still have some ancient criollos in collections, such as the International Cocoa Genebank in Trinidad. A few are also cultivated in Mexico, Venezuela, and Colombia. But nearly all fine-chocolate-labeled criollo are “modern criollos,” a hybrid (Lachenaud and Motamayor 2017).

A few special cacao varieties do come close to heirloom, and a tiny handful may actually be the same as those of the 1500s. Porcelana, a rare and coveted criollo described by some as having a lighter, nutty taste, is still grown in Ecuador, Peru, and Venezuela. Some have called it the “holy grail of pure criollo,” but perhaps taking over that holy spot in recent years is Nacional. Ecuador once dominated the world with its fine-flavor Nacional cocoa beans, also called Arriba (*rio arriba*, or up-river, the variety discovered growing wild, apparently by Spanish conqueror Francisco Pizarro in 1526). Unfortunately, in the 1930s, disease ravaged the plantations; growers came back with more resistant and robust cultivars (Boza et al. 2014). Seeds from the Trinidad-based F. J. Pound Collection of the 1930s, primarily Trinitario, replaced Nacional, and the few of that variety left hybridized naturally to produce a new variety. CCN-51, developed in the 1960s by an Ecuadorian researcher, came to dominate production.

Heirloom Nacional, not in the criollo group, was thought to be extinct. Most “Nacional” fine-flavor cocoa sold today, like criollo, is actually a modern hybrid (Toth 2018). But in 2009 a few surviving trees were found in a remote area of Ecuador. Genetic analysis at the USDA found these to be 100 percent Nacional. Cuttings were taken and a breeding program launched. This pinnacle of heirloom chocolate in 2021 was available online—at caviar prices.

Heirloom cocoa is always fine, or “flavor” cocoa, and while world production in 2017 was only 5–6 percent of the total, it was coveted worldwide and so commanded prices up to five times that of bulk cocoa (Lachenaud and Motamayor 2017). Interest in 2021 was growing as the bean-to-bar craft chocolate movement has expanded. The Fine Chocolate Industry Association in 2018 launched the Heirloom Cacao Nursery Project in an effort to protect and expand heirloom cacao. In partnership with the USDA, it worked with farmers to identify and cultivate heirloom varieties. Projects were mostly in Central and South America but also in Madagascar, Tanzania, the Philippines, and Vietnam. Its marketing arm listed retailers of heirloom and fine chocolate worldwide.

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Cadbury Chocolate (UK)

Nearly two centuries ago, John Cadbury opened a grocery in central Birmingham, England, next door to his father's drapery and silk store. Cadbury planned to offer tea and coffee. He also decided to offer another drink, cocoa, ground on the premises with a mortar and pestle (Cadbury n.d.-a, n.d.-b.). As a Quaker, Cadbury hoped to find advantage in the growing national temperance movement. While Quakers were not themselves teetotalers contrary to presumption (some owned breweries), they were particularly interested in taking advantage of growing industries that could help them become successful. Few other options were open to Quakers such as John Cadbury: their religion precluded military service or clerical positions. As only Anglicans could attend university, they were barred from many professions until 1871. But they could build businesses that reflected the religion's paternalistic emphasis on values of social welfare and ethical business practices (Kasprzak 2012).

Cadbury began what became his influential ad campaigns with a modest beginning. In March 1824, the *Birmingham Gazette* carried this notice: "John Cadbury is desirous of introducing to particular notice 'cocoa nibs,' prepared by himself, an article affording a most nutritious beverage for breakfast" (Cadbury n.d.-b). By 1842, a price list presented a range of products: sixteen varieties of drinking chocolate and other cocoa items including pressed cakes, powder, flakes, nibs, "Pearl,"



John Cadbury (1801–1889), a Birmingham, UK, purveyor of tea and coffee, grew his small cocoa operation into one of the most influential chocolate manufacturers of the nineteenth and twentieth centuries. By the early 1900s Cadbury chocolate dominated worldwide manufacturing. (Library of Congress)

and “homeopathic” (Cadbury n.d.-a). In 1847, Cadbury moved to a larger factory and spun off the retail business to his nephew.

But then the small business faced setbacks. An economic depression in the 1840s left many British businesses struggling from low sales. And in 1851, London physician Arthur Hill Hassall began a series of reports in *The Lancet* that shocked the country: most British chocolate contained foreign substances, some of them health hazards. Both Cadbury Chocolate and a mighty competitor, J. S. Fry, were included in the indictment. While their products did not contain dangerous adulterations, they did contain flour or other starches. These were commonly used as cocoa extenders and to soak up the unattractive high cocoa butter content of unpressed chocolate (Hassall 1855; Cadbury 2010). Fry responded by arguing that these additions did not threaten health and, in fact, enhanced the

product. George Cadbury himself had approved of the additions to attenuate the greasy cocoa butter, calling it a “comforting gruel” (Cadbury n.d.-b). But apparently sensing the pure-food movement that was growing into stricter government regulation, Cadbury responded. The company removed the starches and launched an advertising campaign in 1862 that touted the (newfound) purity of its chocolate. Cadbury’s advertising symbolized purity by depicting beautiful women and healthy children in a series that has become iconic early advertising art (Grivetti and Shapiro 2009; Coe and Coe 1996; Cadbury 2010).

The British government’s 1853 reduction on cocoa bean tariffs brought a cheaper product to more British homes. John’s sons Richard and George assumed control of the company but still struggled to find success. In 1866, their fortunes would turn. The company introduced Cocoa Essence. The product was possible because George had been able to persuade Coenraad Van Houten in Holland to sell him one of his patented cocoa presses. Cadbury relied on Van Houten’s press to remove some of the cocoa butter, producing a less fatty drink. In 1867, the company, impressed by the success of a purity campaign for Pear’s Soap, launched a

similar aggressive advertising campaign for its Essence with the slogan, “Absolutely Pure, Therefore Best” (Cadbury n.d.-a; Cadbury 2010). In a fateful decision to tie its fortunes to advertising, the Cadbury brothers were turning their backs on a Quaker value that disdained “puffery,” as Quaker rival Rowntree of York called it. However, the firm was desperately searching for a way to compete with Rowntree, Fry, and other enormous chocolate makers of the time. Another competitor, Taylor Brothers of London, claimed to be Europe’s largest drinking cocoa and mustard manufacturers, with fifty cocoa varieties. Émile Menier in France was hoping to take his successful yellow-wrapped chocolate across the Channel. Cadbury decided to take a last gamble (Cadbury 2010).

While Cocoa Essence was far from the first cocoa powder made using the Dutch Van Houten press invented nearly forty years earlier, Cadbury’s extensive advertising of its purity turned it into a great British success. After thirty years of advertising, Cadbury’s sales finally surpassed that of its main competitor, Fry, and the company emerged as one of the largest manufacturers as chocolate was moving into the everyday life of British consumers.

Cadbury built on its success with its first bonbons—chocolate-enrobed candies in a heart-shaped box for Valentine’s Day. And in 1875, the company introduced the Easter egg. It began as a dark chocolate egg filled with dragées, a sort of hard-shelled confection. Today’s creamy style began in 1971 (Mondeléz International n.d.). But the chocolate that proved most profitable for Cadbury was unveiled in 1905, Dairy Milk. The year before, George Cadbury Jr. hoped to ride on the exploding popularity of milk chocolate by inventing a bar with more milk in it than any other on the market. His formula touted a glass and a half of milk in every half-pound (225 g) bar. This became the company’s most popular product, boosting Cadbury to the top of British cocoa manufacturers by 1915. Britain emerged as the largest cocoa-consuming country in the world (Cadbury, Burt, and Horton 1910). For the first time, milk quality and its processing took priority over quality of chocolate itself. In 1919, Cadbury and its main rival, Fry, merged (Mondeléz International n.d.; Macedo 2016).

Cadbury’s importance to the history of cocoa goes beyond its commercial success. The Quaker values of the Cadbury family had become infused within the company at a time of increasing concern over working conditions of the Industrial Revolution and continued slavery in the production of cacao. As the company expanded in 1879, Richard and George Cadbury decided to move to a new site about four miles from Birmingham. But the new factory would not be typical. On a fourteen and one-half acre site south of the city, the Cadburys constructed a factory town they named Bournville. Senior employees were housed on site until 1893, when another 120 acres were added, with 143 more cottages for workers (Cadbury n.d.-a). Cadbury, along with British chocolate industrialists Fry and Rowntree, emphasized Quaker values of paternalism and the idea of “industrial philanthropy” emphasizing “the worth of each individual” (Fitzgerald 1999). Hours were reduced, legal holidays observed, and employees received a half-day off on Saturdays. Bournville benefits for workers extended to include sick pay, pensions, medical and dental facilities on site, and charitable trusts (Fitzgerald 1999; Prinz 2017). Milton Hershey, not a professed Quaker, but from the Quaker

state of Pennsylvania, visited the Cadbury site before developing his own company town.

Cadbury's values extended beyond interest in the welfare of the Bournville plant workers. At the turn of the twentieth century, no country had legalized slavery, the shame of cacao cultivation for centuries. Cultivation had moved from exclusively a New World crop to one that would soon be dominated by African colonies. Portugal had almost a century before transplanted *Theobroma cacao* from Brazil to two small island colonies off West Africa, São Tomé and Príncipe. By the end of the 1800s, colonists had turned the islands into a monocrop culture of cacao. On their way to becoming the world's largest supplier of cocoa beans, São Tomé and Príncipe gained a new nickname, the Chocolate Islands. Cadbury Chocolate sourced at least one-third of its cocoa from these islands (Cadbury, Burt, and Horton 1910). But rumors began to surface suggesting Portuguese colonial operations were building success on more than their efforts to establish industrial efficiency in the plantations.

While Portugal had abolished slavery in its colonies in 1858, on the islands it had replaced it with a contract labor system requiring African laborers from Angola on the mainland to work for a specified time period. Cadbury and others suspected that apparent tactics of coercion, both in finding the workers in Angola, and forcing them to renew contracts, made the Portuguese system in effect a form of slavery.

Cadbury sent a representative, Joseph Burt, to investigate. Burt was preceded by Henry Nevinson, a muckraking journalist who in 1904 began a series of investigative articles in *Harper's Magazine* to offer a scathing denunciation of the cacao operations on São Tomé and Príncipe (Higgs 2012). Cadbury preferred to rely on his own witness, however, and with support from large chocolate manufacturers Fry and Rowntree, Burt landed in Angola at the end of 1905. His report to Cadbury in 1906 corroborated that of Nevinson. In 1907, Cadbury had circulated the report to the British government and manufacturers with William Cadbury's conclusion: the Portuguese plantations were in effect slave operations. Cadbury wrote in a 1910 reprint of the initial report that the investigation was "confirmation of all the worst reports that have from time to time filtered through to the public, of the inhuman treatment of the weaker races of this vast district, by white men" (Cadbury, Burt, and Horton 1910, viii). Cadbury decided he had to see for himself and so also paid a visit not only to Africa but also to Lisbon to question authorities there who supported the colonial enterprises. "The existing system of trading in human beings, or their retention for life, which we in England call slavery," Cadbury concluded, "must be stamped out of the colonies of every country that wishes to consider itself civilized" (Cadbury, Burt, and Horton 1910, 99–100).

Cadbury was not convinced by Portuguese promises to end the system, and so on March 9, 1909, announced a boycott of the islands' cocoa, urging other large manufacturers also to do so. Fry, Rowntree, and Stollwerck in Germany joined the boycott. Baker, then the largest chocolate manufacturer in the United States, had long before that stopped buying cocoa from the Chocolate Islands. But other U.S. and European makers were slow to boycott and business continued. Portuguese planters made note that Cadbury had waited until the end of the harvest, filling the company supply houses with the islands' cocoa before announcing the boycott (Macedo 2016). Portuguese authorities did make an effort to improve the system,

improvement formally acknowledged by the British government in 1914 (Higgs 2012). But World War I drew attention away from the abuses. Disease decimated the islands' cacao trees, and much of the world's production moved to the mainland of Ghana and Ivory Coast, where it remains today.

Cadbury continued in the twentieth century to become one of the world's dominant chocolate manufacturers. In 1906, it introduced Bournville Cocoa; in 1915, Milk Tray; and in 1920, Flake. All of which became iconic British chocolate products. While it has never been as well known in the United States, Cadbury remains the most familiar brand in Australia and India as well as the United Kingdom. Cadbury did, however, undertake an aggressive effort to become a major player among the U.S. big chocolate firms dominated by Mars, Hershey, and Nestlé. The 1984 launch of Cadbury brands reformulated for what the company perceived as an American taste, however, did not go well. Wholesalers did not stock the bars. In 1988, Cadbury gave up and sold its U.S. operation to Hershey for \$300 million (Cadbury 2010). In 2021, Hershey continued to market Cadbury's legendary Dairy Milk bar, though critics said it did not taste as creamy as the British formulation.

In 2010, reflecting a cocoa industry trend toward consolidation into huge confectionary conglomerates, Kraft Foods acquired Cadbury to become Mondelez International Inc. It was one of the largest acquisitions in British history (Cadbury 2010). In 2013, Mondelez was listed as the world's second largest manufacturer of confections after Mars USA (Squicciarini and Swinnen 2016). But Cadbury's relationship with slavery had still not quite come to an end at the beginning of the new millennium. A British television documentary in 2000 included shocking revelations that Ivory Coast farmers were keeping up to fifteen thousand children, most of them rounded up by human traffickers, to work on cacao farms. The *Financial Times* reported the next year that Cadbury and Nestlé were ignoring reports of child slavery in cacao (Lawrance and Roberts 2019). Cadbury responded that it did not buy from Ivory Coast, but from Ghana. Still, it and other large cocoa multinationals made promises to work for an end to child labor in African cacao farming. As of 2021, however, children still toiled in cacao fields, the practice being difficult to root out among impoverished small-farming operations (Pilling 2019).

As part of Mondelez, Cadbury has joined several other large multinationals to establish formal programs in an effort to improve welfare of farmers and sustainability of cacao. Its Cocoa Life program in 2020 worked, according to its director, "to create a vibrant, strong cocoa supply chain while growing opportunities that transform the lives and livelihoods of farmers and their communities." Cathy Pieters reported that 175,017 farmers were registered with the program, and 63 percent of its chocolate came from this source. The 2019 report stated that its work has doubled farm productivity and trained nineteen thousand young people in sustainable cocoa-related areas, among other achievements (Pieters n.d.).

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Caffeine/Theobromine

Chocolate's mildly stimulating effect has contributed to its popularity through centuries of use. Pre-Columbian cultures of Mesoamerica chose to drink chocolate not only for its nutrients but also for its contribution to staying awake and being productive (McNeil 2006). But the chemicals behind the effect were not isolated until the nineteenth century. Today everyone knows—and many people crave—the effects of caffeine. Many people presume that is also the main ingredient in chocolate that adds a little zip to our step. That is not quite wrong, but mostly incorrect.

It is not quite wrong because chocolate does contain caffeine but not so much. Even in dark chocolate with a high percentage of cacao mass, caffeine at most would be about 80 milligrams. In a typical bar of milk chocolate, caffeine may be as little as 9 milligrams (PetMD n.d.). In comparison, a typical 12-ounce cup of Starbuck's Coffee contains 235 milligrams of caffeine.

So, while most chocolate probably will not offer a big boost from caffeine, what it apparently offers is a boost from theobromine. Theobromine is one of many

naturally occurring alkaloids that can be attractive for a stimulating effect. Some of these are wildly popular worldwide, namely, caffeine. Others are perhaps wildly popular worldwide but also illegal, namely, cocaine. Others are wildly popular, legal, but often risky: morphine and nicotine. Then again, others are poisonous: strychnine. Opium also is an alkaloid, once legal, esteemed by Sigmund Freud as a useful stimulant (Squicciarini and Swinnen 2016). Theobromine, however, is generally not considered addictive. Its stimulating effect appears to be similar to caffeine, though not as pronounced. And unlike caffeine, theobromine is abundant in chocolate.

Theobromine in nature is not as common as caffeine, present in less than two dozen plants, including *Camellia sinensis*, that is, tea. But the substance was actually isolated from cacao seeds in the 1840s as a contributor to chocolate's familiar stimulating effect. As an alkaloid, theobromine is also bitter, a major contributor to the bitterness we associate with dark chocolate.

Theobromine was oddly named: it contains no bromine. That element, *Br* on the atomic table, has been useful to pharmacists as a sedative or anti-seizure medication and was long a part of many chemical-based photographic films. Theobromine, on the other hand, only appears related by coincidence. Linnaeus in 1753 named the cacao tree *Theobroma cacao*, "food of the gods." When the stimulating alkaloid was discovered in cacao nearly a century later, it joined the naming convention common to that family of chemicals ending in "ine" (caffeine, nicotine, morphine, strychnine, cocaine), hence, "theobromine" (Drahl 2017).

Chocolate contains from 0.55 to 2.7 percent theobromine. Research on its health benefits is inconclusive. In addition to the bitter flavor that some chocoholics like (and others detest), we do know it stimulates the heart and encourages urination as a vasodilator (Kunisuke et al. 2010). It may also be useful for asthma and coughs, and is safer than codeine (Martinez-Pinella, Oñatibia-Astibia, and Franco 2015). It may have anti-inflammatory effect that some health research has found to be an attraction of chocolate. It can improve alertness. But both caffeine and theobromine can also cause anxiety and irritability in those sensitive to these stimulants. It may cause acid reflux (Squicciarini and Swinnen 2016).

Recent research indicated theobromine did not have the same stimulating effects at the same level as caffeine. However, the combined effect of caffeine and theobromine in chocolate may be responsible for the stimulating effect that anecdotally many consumers report. Theobromine did show positive effect on mood in moderate doses and increased heart rate (Baggott et al. 2013). We do know one thing for certain: chocolate can be toxic to pets, and the theobromine is to blame (see **Dogs, and Chocolate**).

LEVELS OF THEOBROMINE AND CAFFEINE IN SELECTED COMMON CHOCOLATE PRODUCTS (PETMD N.D.)

Hershey's Milk Chocolate bar, 43 grams (1.55 oz.): 64 mg theobromine; 9 mg caffeine

Milky Way bar, 58 grams: 37.1 mg theobromine; 3.5 mg caffeine

Dry cocoa powder (Dutch process), 86 grams: 2,266 mg theobromine, 67.1 mg caffeine

Unsweetened baking chocolate (squares), one cup grated, 132 grams: 1,712 mg theobromine, 106 mg caffeine

Dark chocolate, 70–85 percent cocoa solids, one average bar: 810 mg theobromine; 80.8 mg caffeine

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Callebaut Chocolate (Belgium)

Callebaut Chocolate began cocoa life in Belgium when Octaaf Callebaut branched out from the family beer operation to fashion a recipe for the popular confection. The Wieze, Belgium, chocolate entrepreneur emerged in 1911 with a well-conched recipe (see **Conch, Conching**). It produced a smooth product that became regionally popular. Callebaut’s reputation for high-quality chocolate “in the Belgian style” did not lead to a retail product, however. During World War I, the company produced its first couvertures to fill needs of bakers and chocolatiers who could not find ingredients (Callebaut n.d.). Callebaut’s couverture, a high-cocoa-butter product that flowed easily for use in pastries and candies, became popular after Octaaf invented a method to transport and store it in liquid form, eliminating the need for refrigeration (Squicciarini and Swinnen 2016).

Belgian chocolate in 2021 was known worldwide for its distinct quality, but the country’s producers were relative newcomers to an industry that by the twentieth century had already become dominated by massive industrial manufacturers. Callebaut’s Belgian-style chocolate was exported for the first time in 1960. As its international reputation grew, in 1988 it introduced “Callets,” a brand name for the oval disks or wafers sold to chocolatiers as couverture. In that same year it opened

its first chocolate school, Callebaut College, later named Callebaut Chocolate Academy Centers, catering to pastry chefs (Callebaut n.d.). These centers in 2020 operated throughout the world, including one in the United States in Chicago (Chocolate Academy n.d.).

While Callebaut does not sell snacking chocolate for retail, it made an enormous impact on the intermediate cocoa sector when in 1996 it merged with French manufacturer Cacao Barry. The result was to grow into the world's largest chocolate processor in 2021. It included cocoa sourcing and grinding as well as wholesale chocolate production. Barry Callebaut moved its headquarters to Zurich, Switzerland, in 1998, and has acquired chocolate factories worldwide including Petra Foods (Singapore) and World's Finest Chocolate, Chicago (Barry Callebaut Group n.d.). As of 2018, it was considered the world's largest supplier of chocolate and cocoa products, directing a global staff of eleven thousand, fifty-five factories worldwide, and, in its enormous Belgium operation, producing 340,000 tons of chocolate a year. A quarter of the world's chocolate products contained ingredients from Barry Callebaut (Confectionary Production 2018). About 70 percent of its cocoa came from Ghana and Ivory Coast. In the latter country, Barry Callebaut established its own distribution system to improve consistency, and in Ghana it ran its own large cocoa-grinding operations (Barry Callebaut 2005).

Barry Callebaut is not a household name to most casual chocolate fans, but it hit the news in 2017 on its announcement that, for the first time since Nestlé's 1930s introduction of white chocolate, it had produced an entirely new product it called ruby chocolate (see **Processors; Ruby Chocolate**).

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Carob

Carob, an ancient tree of the Mediterranean, does not appear to resemble cacao. It is an evergreen of the pea family. However, carob does produce sweet pulp from pods, as does cacao. Unlike cacao, it does not produce edible beans. But the pulp can be dried and ground for food or beverage. Carob may help treat diarrhea or, processed differently, can be a mild laxative. It can treat a cough. These

medicinal properties also have been claimed for cocoa. Carob is also indicated for those who have intestinal disorders such as celiac disease (Plants for a Future n.d.; WebMD n.d.).

Unlike cacao, however, carob's history dates from biblical antiquity. The story of St. John in the desert claimed he survived on honey and "locust," and today carob is sometimes called locust bean or St. John's Bread. As an ancient system of weight measurement, the seeds, five to the gram, were the "carats" carried by ancient goldsmiths (Trees of Stanford n.d.).

While it is reasonably nourishing today as a drink or food, we have no evidence that historically carob was considered as a chocolate substitute. It was an important source of sugar before cane sugar became plentiful in the 1600s (True Treats Candy n.d.). Legend says it sustained the Duke of Wellington's troops during the nineteenth-century Peninsular War in Spain, though solid evidence of that is scanty.

Carob cultivation came to the United States in the decade before the Civil War. The southern European tree likes dry heat and does not tolerate cold, and so it grows well in the Southwest. It became associated with chocolate, however, in the 1970s. The growth of the organic whole food movement encouraged some participants to consider the disadvantages of cocoa: it contains possibly harmful stimulants, notably caffeine and theobromine, that may upset some systems unable to tolerate them. Carob contains none. Cocoa is high in fat. Carob is high in sugar and has some protein, but contains no fat. And cocoa, at least in its high-cocoa solid form, is somewhat bitter. Carob is not.

Organic foods recipe books touted carob flour as a cocoa substitute in pastries and carob as a healthier candy substitute for children. It did not catch on among children, as carob does not have the ability to melt in the mouth like chocolate nor the silky smoothness of a well-made candy bar. But it did not really catch on in adult baking either. By the 1980s, the carob craze was on the wane (Kauffman 2018). Today carob is sometimes offered as a vegan substitute for chocolate. But chocolate by itself also is vegan. It is the common additives, notably milk, that limit mass-produced chocolate's vegan appeal. Carob has mostly returned to its traditional place as a reasonably healthy food not related to cocoa. Some who use it will still argue it tastes like dark roasted chocolate (The Nutty Scoop n.d.) though it does not have the same texture. However, most culinary experts and probably all children will counter with this: nothing in the world tastes remotely like chocolate (Squicciarini and Swinnen 2016).

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Cats, and Chocolate

See Dogs, and chocolate

Chicha (Chocolate Beer)

Cacao pods and their gelatinous pulp quickly begin to ferment in tropical heat. Controlling this process marks the first step in turning cacao seeds into cocoa beans, thence into chocolate. But evidence exists that early natives in Central and South America instead favored the fermented pod contents itself for a drink we today call *chicha*, sometimes nicknamed “chocolate beer.”

Ignoring the seeds, natives discovered millennia ago that cacao pod pulp could produce a fermented beverage. Early Franciscan missionary Bernardino de Sahagún, arriving in the New World in 1529, observed natives producing many beverages made with cacao, including the typical chocolate drink from the ground beans (McNeil 2006). But archaeological evidence indicates chicha dates to 5000 BC in the Andean region of South America. This is far earlier than the earliest evidence of chocolate. We have evidence that the Olmec culture in what is now southern Mexico consumed a drink from cacao in liquid form as early as 1800 BC. This may be the earliest evidence of a beverage made from cocoa beans. Regional chicha varieties were made from other foods, most commonly maize (corn) (Powis et al. 2011; Fermentation Association 2021; Ohio State University n.d.). Presumably chicha was a precursor to the familiar chocolate drink today made with the fermented and roasted beans, although evidence is uncertain regarding when the bean-based beverage first appeared.

Chicha today is popular in parts of Central and South America. It may be alcoholic or not, and may or may not include cacao. European-style “chocolate beer” that appeared in the United States beginning in the mid-1990s may or may not actually contain chocolate. Brewers sometimes use a darkly roasted malted barley called “chocolate malt” to impart a dark-brown hue to the brew. Or they may use actual chocolate, either melted into the beer or added in liquid or powdered form (Nurin 2017).

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Chocolat, Chocolate, and Xocolatl

Chocolate as a word came to Europe by a variety of spellings based on the appearance of the Spanish word *chocolatl* in the mid-1500s. But that was not the original term. Cortés knew it by its ancient Maya name, *cacao*. Its transformation to the European word is uncertain. Historians often presume it to have been a variation of *xocolatl*, "bitter water" in ancient Maya (History Daily 2019). Maya did not add sweetener to their cacao beverage to temper chocolate's natural bitterness. Later Aztecs called the drink *cachuatl*, cacao water. Historical research by Coe and Coe (1996), however, seemed to indicate that the European word was not merely a reworking of *xocolatl*. On the other hand, they did observe that Europeans first encountered the Maya lowlands drink as a hot beverage. Maya for hot is *chacau haa*, and in Yucatan, *chocol* means hot (Coe and Coe 1996). They surmised the Spanish, who settled mostly in the old Aztec Empire, may have put together the Maya word *chocol* and the Aztec word for water, *atl*, to reflect a new term for a new European sweetened cocoa not known to the Aztecs. Then again, the explanation may be even more basic: *caca* in Latin-based Spanish and French means "poop." *Cacahuatl*, being a brown beverage, may not have had sales appeal in Europe (Coe and Coe 1996).

In any case, from Spain it arrived in Europe as *chocolatl*, though it did not find a stable spelling until the 1700s. English physician Henry Stubbe in his 1662 treatise called it *chocolata*. In 1664, the English diarist Samuel Pepys wrote, "About noon out with Commissioner Pett, and he and I to a Coffee-house, to drink jocolatte, very good" (Pepys 1664, November 24).

Spelling became standardized by the turn of the seventeenth century. Original countries that introduced the beverage to Europe, Spain and Portugal, adopted the spelling *chocolate*. English-speaking countries copied that standard. The Danish called it *chokolade*, the Dutch *chocolade*, the Italians *cioccolato*, the Swedish *chocolad*, and the Germans, *schokolade*. Before that, William Hughes, a physician who encouraged the spread of native American foods to Europe and North America, in 1672 wrote, "It hath been called by many names, as Chocolatl, Chocolath, Chocolet, Chcolate, Chocolat, and Chocolata: Nay, it hath been called by some heretofore Succulata; and all these do now signifie one and the same thing" (Hughes 1672, 115; Wilson and Hurst 2012).

The French first adopted the Spanish/Portuguese/English word *chocolate*. And then they dropped the "e," to *chocolat*. We are not certain why that happened, but we can trace it to a fairly specific date. *La Gazette*, Paris's first newspaper,

referenced the beverage for the first time in a 1656 report of the English capturing a Spanish ship with “fruit suitable to make the beverage that they call Chocolate” (*La Gazette* 1656, 1343). Frequent *Gazette* newspaper references throughout the century and into the early 1700s spelled the word with an “e,” *chocolate*. That changed abruptly; 1721 references spelled it with an “e.” Those of 1722 and later spelled it without the “e,” *chocolat*. In doing so, the French adopted a spelling that left the word to be pronounced in a distinctly different way from that of other Europeans: “sho-ko-la.” The change may have been dictated by the publication of the influential *Nouveau dictionnaire de l’Academie françoise* in 1718. On page 262 of the first volume, the beverage is defined as “a composition made from cacao, sugar, vanilla, cinnamon, etc., reduced to a paste, and one dissolved ordinarily in boiling water to make an agreeable beverage” (1718, 262). The title of the entry: *CHOCOLAT*. This authority would likely have been generally adopted in France, but some confusion still existed: in the same dictionary, *CACAO* is described as “a sort of almond locked inside a pod and which being roasted and mixed into a paste, makes the principal ingredient for the composition called Chocolate” (1718, 197). We are not certain why the French Academy decided to drop the “e.”

CHOCOLAT: THE FILMS

In a different context, *Chocolat* also is the title of a 2000 Miramax film in which, according to the official website description, a new arrival in a small French village opens a chocolate shop and “creates mouth-watering confections that almost magically inspire the straightlaced villagers to abandon themselves to temptation and happiness.” Alfred Molina, Johnny Depp, Judi Dench, Juliette Binoche, and Victoire Thivisol star (Miramax 2000). Critics called it “sweet” and a “feel-good movie,” in which chocolate becomes the magic food capable of inspiring change and healing which, of course, burnishes the traditional reputation of chocolate as an inspiration to romance. *Chocolat* generally received positive reviews and was nominated for five Academy Awards. The film was set in France but was in English, causing a few critics to complain about English speakers trying to mimic a French accent. It is based on a 1999 novel by Joanne Harris and directed by Lasse Hallstrom.

While this is perhaps the most well-known movie to anglophones with the title *Chocolat*, it also was the title of a 1988 French film offering a portrait of tensions in Cameroon during the French colonial era directed by Claire Denis (Kinoeye 1988). A 2016 film of the same name, also French, is a biography of a late-nineteenth-century Parisian circus performer from Cuba, Rafael Padilla, nicknamed Chocolat, and his encounters with French racism of the era (McMahan 2020). A French movie with the word *chocolat* in the title, *Merci pour le chocolat* (2000; director Claude Chabrol), depicts a dysfunctional family in which the well-known French actress Isabelle Huppert plays the wife and owner of a famous chocolate factory. Instead of romance or skin color, in this case chocolate’s old reputation as a means of poisoning features drugged chocolate that causes a fatal car accident (New Wave Film 2000).

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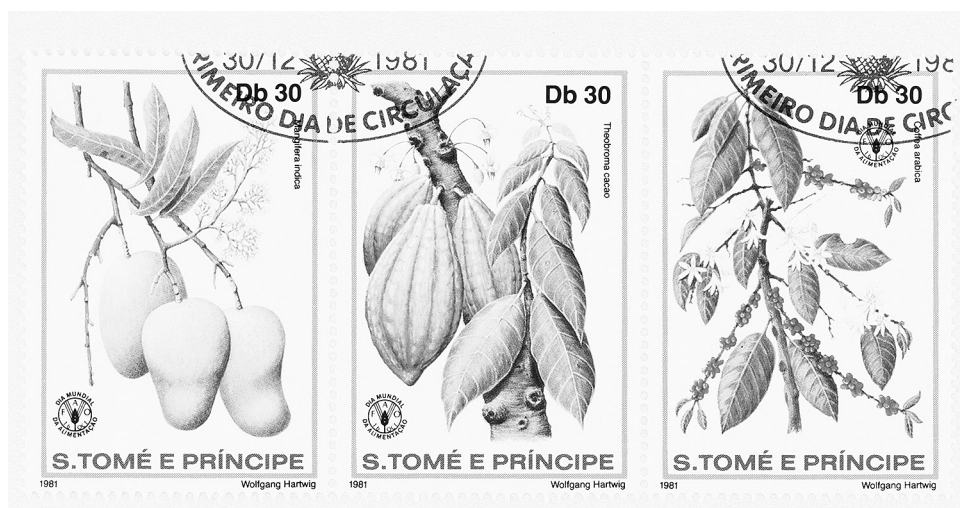
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Chocolate Islands (São Tomé and Príncipe)

Two dots of landfall about 150 miles west of the central African mainland more than a century ago claimed the world's imagination as the charming and alluring Chocolate Islands. In the early twentieth century, they grew to become the world's largest producer of cocoa. But the facts of these former Portuguese colonies tell one of the more sordid stories of cocoa history.

By the seventeenth century, Portugal, a colonial rival to Spain, had established cacao plantations in its huge South American colony of Brazil. The operation began under the religious order of Jesuits. Missionaries who knew of cacao trees growing in northwest Brazil saw an opportunity to profit from Europe's explosion of popularity for chocolate in the 1600s. Relying on compelled native labor or slaves, Jesuits collected pods from the wild cacaos. It became a profitable means of support for the order's worldwide missionary operations. But work in the remote Amazon basin was inefficient. In 1664, Brazil's viceroy proposed the possibility of cultivating trees in the region of the country's colonial capital, Bahia. Here producers could rely on a stream of African slaves, as the colonial capital of Salvador de Bahia was on its way to becoming one of the world's largest slave importers, with more African slaves passing through the port than any other city of the New World except Rio de Janeiro (Ribeiro 2008).

The growing and profitable cacao industry so benefited the Jesuits that the Portuguese Crown, fearing the order's threatening wealth and power, joined Spain to expel the Jesuit Order in 1767. The Portuguese government took over an established cacao *roça* (plantation) system as a state monopoly.



São Tomé and Príncipe, two specks of land in the Atlantic west of Africa, rose to become the largest producer of cacao in the early twentieth century, dominating other principal crops of coffee and tropical fruits, as depicted on these stamps. (Meisterphotos/Dreamstime.com)

But the colonists had other ideas. In 1822, after a series of political upheavals, Brazil declared its independence from Portugal. Profits of the breakaway colony's profitable chocolate operation apparently would be lost to the Crown in Lisbon.

In fact, authorities were not about to abandon a lucrative enterprise like cacao. Before retreating, the Portuguese took with them either seeds or possibly cuttings of the Amelonado cacao variety. They transplanted those to small islands off the coast of Gabon that since the 1500s had been Portuguese colonies and vectors for the slave trade: São Tomé and Príncipe. This may have happened slightly before the independence date of 1822 or shortly thereafter. It is not certain who actually took the transplants, although researchers believe it was ordered by the Portuguese monarchy (Walker 2007). It was a commercial coup. Soon after, the upstart transplant cacao tree rose to dominate existing sugar cane and coffee operations as a colonial cash crop on the islands. The Brazilian *roça* (plantation) system was transplanted to the islands for its efficiency, if not for its brutality. The colonies had already relied on slave-operated plantations for sugar cultivation and, when it became a valuable export in the nineteenth century, coffee. When coffee prices began to fall, cocoa replaced the trees, but on these islands colonial plantation owners saw opportunity from something new: the growth of scientific agriculture.

The islands' Portuguese plantation owners, mostly based in Lisbon, determined that carefully run *roças* relying on scientific methods could produce a better cocoa bean at a higher profit. Seeds would be standardized; slave workers would be regimented into military-like efficiency (Macedo 2016). Coerced workers would be forcibly removed from Angola, another Portuguese colony, under the argument that white plantation owners could provide safety and a civilizing influence as opposed to the harsh control of African chieftains on the continent. This "white

man's burden" argument was persuasive in a racist society of the late 1800s, particularly after Portugal abolished slavery in its colonies in 1869. (It was not abolished in Brazil until 1888.) A cacao monoculture relying on coerced African labor, slavery in every way but the name, brought industrial methods directed by white owners to an efficiency that grew the island's cocoa into a reputation of highest quality. The plantation science developed there became a world standard, not only in growing but also in careful seed processing to lower the characteristic bitterness of chocolate that was becoming more and more objectionable to European and American palates. European technological experts who visited came back impressed (Macedo 2016). But a sinister underside to the modern *roças* began to trouble some Europeans, as African slavery and coerced labor in the nineteenth century was evolving from acceptable to evil.

A long tradition of enslaved labor in European colonies had not been exclusive to the Portuguese. Every colonial power had relied on it as the way to extract huge profits mostly from sugar, coffee, and cocoa. But Portuguese colonies continued to rely on coerced labor long after it had become discredited elsewhere. In the case of what were rapidly becoming known as the Chocolate Islands, the rumors required examination. A British muckraking reporter was the first to investigate.

Henry Nevinson, a well-known crusading journalist based in Britain, was hired by *Harper's Magazine* to investigate slavery on the Chocolate Islands. The 1890 Brussels Conference Act put a formal end to slavery among colonial powers. It was signed by Portugal among other European countries and the United States. Nevinson sailed to Africa in an effort to personally witness Portuguese compliance. He discovered that in fact there was none. He walked a 250-mile (402-km) slave route and boarded one of the ships bound for "the islands of doom," as they called it, with 270 slaves (John 2002). Nevinson observed natives from the mainland Portuguese colony of Angola were captured, marched to the coast, transported to São Tomé and Príncipe, and held for life as slaves in all ways but the name to work the cacao *roças*.

Nevinson's magazine exposés were collected into *A Modern Slavery* published in 1906. By 1908, the Chocolate Islands had become the world's largest producer of cocoa (São Tomé and Príncipe 2012). Cacao by this time had also reached mainland Africa, and its power as a worldwide producer of cocoa was growing into the dominance it holds today. But the islands' reputation for higher-quality beans kept it as a dominant producer through World War I. Its predominance also attracted world attention for its production—but further revelations would hasten its fall from the world's cocoa pinnacle.

"It is cocoa that has created the prosperity," wrote Nevinson. "The islands possess exactly the kind of climate that kills men and makes the cocoa-tree flourish" (Nevinson 1906, 188). Nevinson wrote that a visit to one plantation featured neat rows of brick huts for the "slaves" and electric lights, turbine engines, and a clean, roomy hospital; "all looked as perfect and legal as an English school" (190). A talk with the doctor, however, indicated a less salubrious story. The death rate for adult workers was 12–14 percent and for children, 25 percent. On Príncipe, the death rate was 20.67 percent; the doctor said plantation owners hoped to keep a slave alive for three or four years. Nevinson pointed out that the contract labor system,

which ostensibly required five years' work before repatriation to Angola, was in fact lifetime indenture: workers were required to sign extensions throughout their lifetimes. The workers, he wrote, were treated reasonably well because they were expensive and died in large numbers, so always at a shortage. But "flogging" was common, "and the prettiest girls [were] chosen by agents as their concubines" (198).

Nevinson's work slightly predated that of another European investigator, Joseph Burt. In 1901, the British chocolate mogul William Cadbury was becoming concerned with reports of slavery in the area from which he received more than half of his cocoa (Higgs 2012). As director of Cadbury Chocolate, at the time one of the world's largest chocolate confectionary manufacturers, the British Quaker showed particular antipathy for a suggestion that the islands supplying so much of his raw material were in fact covering up an operation based on human bondage. In 1905, Cadbury hired Burt to investigate Portuguese colonial practices on the islands and on the mainland (Grivetti and Shapiro 2009). Burt sailed for Angola in 1905. He discovered the brutality on the mainland was worse than imagined. In 1907, Cadbury notified the British government that Burt planned to report that the Portuguese in effect were enslaving the islands' cocoa workers (Higgs 2012). Burt's investigation mirrored Nevinson's. In 1909, Cadbury formally urged a boycott of cocoa from the islands; British firms Rowntree and Fry, and German confectioner Stollwerck joined. Walter Baker, at the time the largest chocolate firm in the United States, had some years before ceased buying cocoa from the islands.

Portuguese authorities reaped large profits from Chocolate Island cocoa; from 1901 to 1913, it represented 34 percent in value of the country's colonial exports (Macedo 2016). In an effort to preserve the trade, Lisbon publicized efforts to improve conditions for African workers. But they did not convince Cadbury to end the boycott. However, world chocolate preferences were changing. The introduction of milk chocolate in the late nineteenth century offered a milder, creamier, and less bitter taste. It became so popular in Europe and the United States that to a new generation it came to define what chocolate was supposed to be. Cadbury Chocolate introduced its high-milk product Dairy Milk in 1905. The bar became the company's flagship confection. The high-quality cocoa from the Chocolate Islands lost market share to a cheaper, more plentiful product from the growing operations on the Gold Coast (now Ghana) and Ivory Coast (Macedo 2016).

A continued effort of Nevinson and Burt to persuade American confectioners to join the boycott faded with attention turning in 1914 to a world war. São Tomé and Príncipe plantations, as Burt acknowledged in 1917, had made some reforms. But concerns remained. An investigation in 1925 showed continued abuses of human labor. By then, however, the Chocolate Islands no longer could claim to be a world leader. An eruption of swollen shoot disease decimated the farms, devastation more serious than the boycotts (Higgs 2012).

By 1975, when the islands became independent from Portugal, the old *roças* and the islands' cocoa industry lay in ruins. But today small bean-to-bar operators are trying to revive the reputation of the islands for high-quality chocolate. HBD Group from South Africa in 2019 was working to reestablish the old *Roça Paciência*, producing vanilla and pepper as well as cocoa. Another producer had

established an estate on Príncipe (Stratton 2019). In 2006, the giant chocolate-processor Barry Callebaut introduced Origin chocolates, advertised as prepared from the world's rarest bean varieties. São Tomé cocoa was one of those advertised origins (Callebaut n.d.).

Perhaps unfairly ignored in a discussion of Africa's Chocolate Islands is a neighbor about 120 miles northeast of Príncipe. Bioko, now part of Equatorial Guinea, is a former Spanish colony once known as Fernando Po. It also saw widespread cocoa cultivation during the island boom times of 1880–1910 (and, to be acknowledged, widespread slavery in its plantations). That cultivation has significance to the chocolate we eat today. It is from this island that cacao seedlings were transported to Ghana (the world's second largest producer of cocoa beans in 2021). We know the trees came from here, and we know they came sometime after 1850. Who transplanted them is in dispute. But in Ghana credit is given to Tetteh Quarshie, originally from Ghana, who in 1876 carried the Amelonado cacao to his farm in the eastern part of the country. The farm is today open to tourists (Taylor 2018).

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Chocolate Soldier

Soldier effigies in milk chocolate have charmed children for decades and continue to be featured in confectionary collections online and in shops. A number of chocolate-based soft drinks have been introduced to the juvenile market as

“chocolate soldier.” Most well known, perhaps, is the Chocolate Soldier soda produced by Monarch Beverage Co., Atlanta, from 1966 to 1988 (“Monarch Beverage Company Inc.” n.d.). An easy-to-grow houseplant, *Kalanchoe tomentosa* with reddish-brown leaf edges features a cultivar named “Chocolate Soldier” (LLifLe n.d.).

But the metaphor that ties chocolate to soldiers sinks more profoundly and sometimes troublingly into Western culture beyond its fanciful use in foods or plants. The term “chocolate soldier,” referring usually to a weak soldier who fears a fight, seems to have begun its road to general cultural metaphor based on a work by playwright George Bernard Shaw. Shaw’s famous play *Arms and the Man*, a comedy published in 1894, brought the meme to public attention. Shaw appeared to ridicule a soldier who declares that he prefers chocolate to armaments. In the first act, the character admits, “I’ve no ammunition. What use are cartridges in battle? I always carry chocolate instead; and I finished the last cake of that yesterday” (Shaw [1894] 1913, n.p.).

The contemptuous female character, “(outraged in her most cherished ideals of manhood),” offers him a nearly empty box of chocolate creams which he dives into, saying “You can always tell an old soldier by the inside of his holsters and cartridge boxes. The young ones carry pistols and cartridges; the old ones, grub” (Shaw [1894] 1913, n.p.).

Shaw’s female character gives the man the nickname “chocolate-cream soldier,” a metaphor for a supposedly cowardly fighter. While the idea of “chocolate soldier” as someone who displays traits considered unmanly may have been somewhat familiar before Shaw, it is the famous author whose play seems to have cemented it into society’s pejorative meaning we see today. However, it seems that Shaw actually did not have that response in mind when he wrote the play. As a metaphor, Shaw seems to have coined the phrase to critique nineteenth-century society’s rigid ideals of manhood and masculinity. A good soldier would choose chocolate for practicality and professionalism—particularly as this character had replaced revolver cartridges with chocolate because the supplied ammunition was incorrect anyway. A literary scholar observed, “Shaw deftly employs chocolate to bring into question conventional notions of soldiering and masculinity” (Satran 2008, 13). Chocolate was, in fact, a common military ration. The chocolate creams in the play were not, however. They symbolized extravagance during a time when chocolate was just beginning to reach mass-market palates (Satran 2008; Oddy and Miller 1976). Shaw defended the integrity of his character by observing chocolate was a valuable commodity on the battlefield. But chocolate creams, as dainty and fragile, reflected feminine characteristics. Apparently, audiences left the theater generalizing that any chocolate-eating soldier would be a man of poor character (Satran 2008).

Shaw’s ambiguous consideration of the “chocolate-cream soldier” did not resonate as the term diffused into popular culture. Soon shortened to “chocolate soldier,” by the twentieth century it became a simple shorthand for a cowardly military man who refused to fight or for a group of cartoonish guards who could do no more than entertain children. Celebrity journalist Richard Harding Davis in his 1897 best-selling novel *Soldier of Fortune* clearly borrowed the metaphor from

Shaw, it apparently already having become so familiar that no explanation was necessary: “Do you agree, Mr. Clay,” she asked, “or do you prefer the chocolate-cream soldiers, in red coats and gold lace?” (Davis [1897] 2006, 50).

Arms and the Man joined the canon of English language plays that have stood the test of time. It has been produced with its famous chocolate soldier scene through more than a century of professional and university runs. In 1908, Oscar Straus turned the story into an operetta, *The Chocolate Soldier*, featuring a character who carries chocolate in his ammunition pouch. In this version, the amused woman he has befriended is charmed by this “little chocolate soldier” (“Chocolate Soldier, The” n.d.). A 1941 film version of the operetta starred Nelson Eddy. The metaphor expanded its appeal to a juvenile audience; a 1934 Disney film featured a cartoon segment, “The Hot Choc-late Soldiers,” and in 1940, *The Wonder City of Oz* featured Emerald City saved from an attack by giant chocolate soldiers. An alcoholic cocktail purportedly inspired by Shaw’s famous character who advocated chocolate, not cartridges, comes in a variety of recipes, usually with brandy or vodka and chocolate shavings, liquor, or crème de cacao.

Chocolate soldier may also be a derisive term for soft soldiers in the Israeli army; members of the Australian Army Reserve are sometimes called chocolate soldiers, shortened to “chocos.” But missionary zeal was behind extending the term to Christianity. C. T. Studd, a well-known British athlete from the late nineteenth century, argued in a 1912 book that Christians should become aggressive promoters of the faith. In his *The Chocolate Soldier: Heroism—The Lost Chord of Christianity*, he wrote, “Every true soldier is a hero! A soldier without heroism is a chocolate soldier! Who has not been stirred to scorn and mirth at the very thought of a Chocolate Soldier?” (Studd [1912] 2012, 1). Advocating what historians today call “muscular Christianity,” Studd argued for physical and moral strength and fitness. He compared many Christians to chocolate, dissolving in water and melting at the smell of fire (Saxby 2020). Today the “chocolate soldier” still is no term of admiration. But we can find exceptions.

One refers not to chocolate as a food, but as a color. A “chocolate” soldier may also be a soldier who is Black or African American. In 2014, a documentary featured U.S. soldiers in World War II who trained in separate army units. Stationed in Britain, these African American troops found a receptive audience among civilians, who treated them as equals, something they did not experience in a segregated United States. *Choc’late Soldiers from the USA*, produced by Drexel University professor Gregory Cooke, documented the units through archival footage and interviews with veterans (McKechnie 2014).

A less attractive but formerly common view of African Americans as “chocolate soldiers” reflects the widespread racism of early twentieth-century United States. One example can be found in sheet music published during World War I in 1918, “Mammy’s Chocolate Soldier,” with music by Archie Gottler, lyrics by Sidney D. Mitchell:

Try to be a soldier like your Mammy told you;
Though your skin is dark as night, I know your little pickaninny heart is white,
And you’ll always be your Mammy’s choc’late soldier. (Mitchell 1918)

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Chocolatier (Video Game)

This is a series of computer video games offering players an opportunity to become a chocolate entrepreneur. The first game, “Chocolatier,” launched in 2007, was described as offering a player the opportunity to become a chocolatier surrounded by mounds of chocolate, who travels the world for ingredients, recipes, and production in multiple factories. “That, AND deal with employees, suppliers, vendors and customers . . . not to mention warding off your adversaries! Do you have what it takes to conquer the world through chocolate?” (GameFAQs 2021). The game was marketed by Steam, “the ultimate destination for playing, discussing and creating games” (Steam n.d.). Other games in the franchise are “Chocolatier 2, Secret Ingredients” (2008), “The Great Chocolate Chase: A Chocolatier Twist” (2008), and “Chocolatier: Decadence by Design” (2009).

The developer of the games, Big Splash Games of Tucson, Arizona, and publisher, PlayFirst, received reasonably positive professional game reviewer response at the game’s introduction. Described as a “business simulation,” reviewer Marc Saltzman of GameZebo wrote that the action begins in 1880, when the player is asked to “restore honor to the recipes of Evangeline Baumeister, a famous chocolatier.” The player’s job is to bring the company back from ruin by finding characters around the world willing to help out (Saltzman 2007). Along the way, the game offers players the opportunity to learn a little bit about cacao origins and terminology, and the cocoa industry.

Another video game, “Charlie and the Chocolate Factory,” was introduced in 2005 to coincide with a film by Tim Burton released that year. In 2020, the Apple AppStore listed twenty-two games with the word “chocolate” in the title. An Xbox video game controller cast in milk chocolate is available on Amazon and other sites.

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Chocumentary

A documentary describes a nonfiction film. Documentaries may examine an industry, a practice, a scandal, a news item, or other areas to establish a historical or educational record. Because the word so easily lends itself to fanciful revision, today we also find references for rockumentary, mockumentary, shockumentary, and more obscure possibilities, some of them sexist, racist, or otherwise offensive (urbanthesaurus.org).

Chocumentary is arguably the most familiar play on the word, however. It is part of a description for at least ten film titles, including a Food Channel visit to a confectioners’ association convention, a twenty-four-minute “delicious romp through the rich and creamy melt-in-your-moth, passionate world of chocolate” directed by Sarah Feinbloom (n.d.), and travel episodes produced by Happy Chocolate Experiences (<http://happychocolateexperiences.com>), offering guided trips to chocolate-producing countries. Perhaps most well known of the films about chocolate in the chocumentary list, however, is actually fiction. “Citizen Candy Man: A Chocumentary” purports to document the family of Willy Wonka after his death at eighty-seven. Written, directed, and starring Joe Dator, the 2005 pretend documentary (or mockumentary) supposedly follows characters of the children’s 1971 classic film *Willy Wonka & the Chocolate Factory* as if they were real people.

Less commonly, as a slang term, “chocomentary” may be a movie about African Americans (urbandictionary.com). In this sense, it is similar to the “chocolate soldier” reference referring to color instead of confection.

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Climate Change

If the tree that produces cocoa beans could be grown in temperate climates, Johnny Appleseed probably would have been Johnny cocoa bean. But the enormous world popularity of chocolate must be supplied by *Theobroma cacao*, a

small tree bearing large pods that grows only between 20° N and 20° S of the equator. In fact, practically speaking, most cacao trees grow about 10° from the equator. They are a bit fussy. They prefer uniform temperatures and high humidity, nitrogen-rich soil, and wind protection. They also are easy targets for pests and diseases (Scott 2016; Ploetz 2007). A tropical rainforest offers perfect growing conditions, as the tree originates in the Amazon region of South America. Today cacao has become a critically important crop to the livelihoods of millions of smallholders worldwide, but particularly in Ivory Coast and Ghana. The two West African countries in particular supply from 60 to 70 percent of the world's cocoa beans. Ivory Coast (Côte d'Ivoire) alone in 2020 exported about 1.65 million tons a year, one-third of the global supply (Juniper 2020).

But those extensive growing regions face a threat from climate change. The world is getting warmer and with it the ideal cacao regions in many countries. Climate, the regular weather patterns in an area, may change in a variety of ways. Rainy seasons may be shorter or more intense, offering ideal conditions for pest or disease spread. Dry seasons may be longer. Average temperatures may rise. In West Africa, hot winds from the Sahara threaten crops once protected by moist sea breezes. These directly affect cacao farms (Dohman et al. 2018; Budiansky 2020; Juniper 2020). Visits to cocoa farmers have indicated that small producers themselves are already feeling the effects. In Ivory Coast, unprecedented droughts lasted for months, while the rain that did fall became erratic (Juniper 2020).

These farmers blamed deforestation for some of the drought, as in many places an intense canopy of trees no longer offers a shield for humidity preservation. Research supports the farmers' observations; rainforest loss not only disrupts local weather patterns and causes increased carbon emissions but also contributes to climate change on a global scale. Farmers faced with reduced yield due to climate change respond by clearing more forests, creating a vicious cycle. Deforestation rates in West Africa are high, 2.7 percent in Ivory Coast, 2.9 percent in Ghana (Cocoa Life 2020).

Climate change is expected to result in a 2.1°C (3.8°F) temperature increase by 2050, with no commensurate rise in humidity. Cocoa production will no longer be viable in many current regions; one study indicated 89.5 percent of cacao-growing regions will become less suitable (Szalay 2018). Farmers can move some operations to a higher altitude; optimal areas in West Africa will rise from 300 to 800 feet above sea level to 1,500 to 1,600 feet. But some of the higher areas are forest preserves that do not permit cultivation (Scott 2016).

In response, a number of nongovernmental organizations and multinational cocoa operations have funded projects attempting to encourage practices that minimize the risk of climate change to cocoa. A solution to rainforest loss is to move farm production to the Brazilian *cabruca* system. Cacao, as a rainforest tree, prefers shade, and so these operations under a rainforest canopy offer good yield and protection (Rupp 2015). The World Cocoa Foundation's (WCF) programs in cooperation with several large companies and other agencies hoped to encourage farmers to choose other practices designed to minimize climate change disruption (Budiansky 2020). Together with the Rainforest Alliance, the WCF in 2018 produced a field manual entitled *Climate-Smart Agriculture in Cocoa*. Possible adaptations included planting drought-tolerant tree species, adapting to

shade-growing systems, or phasing out cocoa in favor of substitute crops such as shea or cashews (Dohman et al. 2018). The initiatives financed by many large cocoa multinationals, sometimes called Big Candy, showed considerable concern that climate change will disrupt the supply chain for a product that has seen considerable worldwide growth, a trend expected to continue (Frydenborg 2015).

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Cocoa (Computer Programming Language)

A large segment of the world's population who may seldom consume chocolate nevertheless uses Cocoa every day. Probably they are not aware of it. Cocoa is the name of the application programming interface (API) for the vast empire of Apple computers and devices. Applications written in Cocoa run natively in OS X (operating system) of Apple Mac computers. Cocoa Touch provides the software to run the iOS system—that is, an Apple smartphone or tablet (Computer Home 2018).

If a programmer wants to build an application to run on Apple computers and devices, she or he has little choice but to learn Cocoa: "To build Mac applications, Cocoa is the only API that is really used anymore" (Wikibooks 2017).

What is an API? Formally, it is defined as a software intermediary connecting applications. Here is one metaphorical way to look at it. You approach the counter of a convenience store planning to buy a chocolate bar. The bar is on a display rack behind the clerk. You cannot reach the bar yourself. You must ask the clerk to fetch it for you. She does, and she delivers it to you. The API is the clerk, acting as a messenger to connect the rack and your fingers. Abandoning the metaphor, Cocoa makes it possible for your apps to communicate with each other. As an example, working from a chat app, you click on a phone number. You want your smartphone to make the call. Cocoa makes it possible.

Cocoa programming includes a graphical user interface (GUI) and ready-made code modules to save time. It includes a complete set of classes, functions, and constants—and it is free. If you have a Mac running a version of OS X, you have Cocoa, and the tools are available from Apple or other sites (Wikibooks 2017).

As important as Cocoa was in 2021, as computer technology goes it actually dates from the age of dinosaurs. Developers in the early 1980s extended the functionality of the C computer language to become Objective-C. Steve Jobs, out of a job after being fired from Apple, in 1985, licensed Objective-C to develop frameworks for his new company, NeXT, forming NeXTSTEP software (Wood 2018). Jobs's NeXT computer introduced in 1988 combined a proprietary screen appearance (GUI) based on the NeXTSTEP operating system. The hardware was sold to Intel and large financial institutions (NeXT Computer n.d.). In 1996, a now-struggling Apple Computer bought NeXT, took Jobs back as an advisor, then acting-CEO, and then CEO, and inserted the NeXTSTEP framework into the new lineup of Macs (NeXT Computer n.d.).

What to name the new system? For a project that was later abandoned, Apple had already trademarked the name Cocoa. To quickly put a trademarked name on its new framework, it called NeXTSTEP "Cocoa" (Wood 2018). Cocoa has been the software backbone of the company every since, becoming API for the phenomenally successful iPhone introduced in 2007. It is no exaggeration to say Cocoa has revolutionized the world.

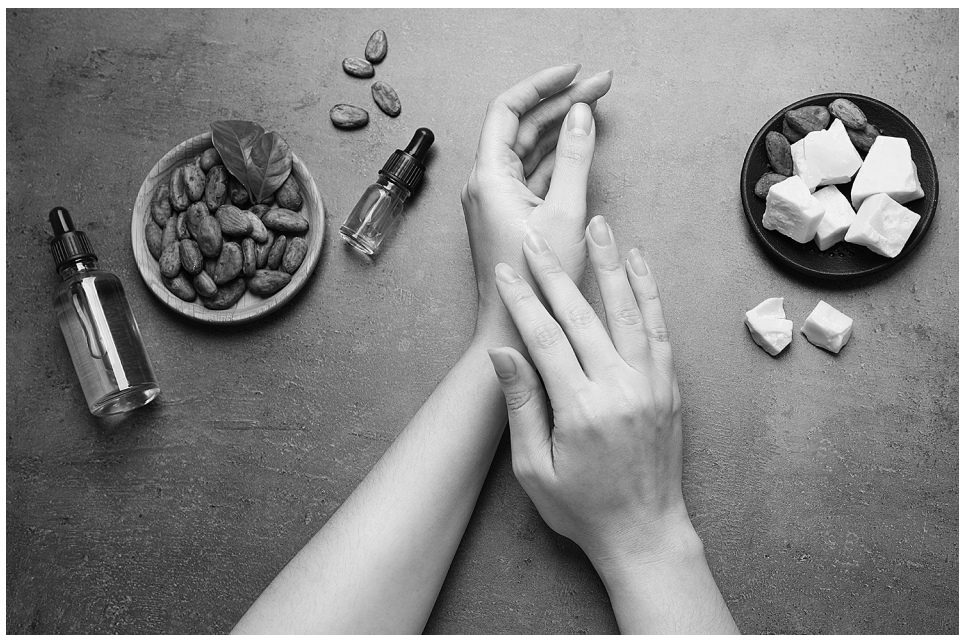
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Cocoa Butter

Cocoa from nature comprises two substances: cocoa solids and fat. The fat we call cocoa butter; it represents about 50 percent of the raw product, though it may range from 40 to 60 percent. Whether that is a good thing depends, and it has depended for centuries. Critically so.

Until the nineteenth century, consumers of what then was nearly always a beverage could do little about the fat. It tended to float somewhat unpalatably to the top of the cup. Chocolate house servers in the 1600s and 1700s commonly skimmed it with a knife. The whisking process using a *molinillo* and chocolate pot created froth and helped to disperse the fat into the beverage. But there was no easy way to remove it.



Cocoa butter, the fat from the cocoa bean, can be extracted for ointments and cosmetics. Because it has become a valuable ingredient in the skin-care industry, some chocolate manufacturers substitute Cocoa Butter Equivalents, CBEs, for some of the fat in their products. This is, however, a controversial practice that detractors contend lowers the quality of the chocolate. (Chernetskaya/Dreamstime.com)

Early physicians and others who weighed in on the health potential of chocolate addressed the fat aspect as a possible advantage or possible annoyance. Did cocoa butter make chocolate a food, or was it really a beverage? The question was critical in Catholic countries, as a food would break the required fast during Lent and before Mass. A beverage would not. (The church in 1662 finally came down on the side of beverage.) For physicians, however, the question centered around a debate on how this food new to the Old World fit into medical philosophy. The Galenic theory of the four humors that underpinned European medicine suggested that, on one hand, cocoa should fit in as cold and dry. On the other hand, cocoa butter, as an oil, should be hot and moist. Which is it? Debate raged even into the nineteenth century. English physician Henry Stubbe in a well-known 1662 work on cacao, opined that cocoa butter “multiplies blood, and vital spirits and enables men to labour” (Stubbe 1662, 35–37).

Stubbe hardly had the last word. By the early 1700s, chocolate had become a booming European success but debate continued. Doctor Giovan Battista Felici joined the debate in 1728 by declaring that cocoa was a “loose, fat, and viscous substance.” It could cause the blood “significant fermentation which can spoil it,” adding for good measure a danger of heart palpitations, intermittent pulse, convulsive movements, and apoplexy (Lippi 2015, 9938). In a short response, Francesco Zeti, who not coincidentally owned a chocolate house, declared that a doctor he had commissioned to investigate the claims showed cocoa “is not replete with

oleaginous and sulfurous parts,” and the “milky spirit” could be beneficial (Lippi 2015, 9939).

Chocolate was certainly a good energy source, and the cocoa butter was to be credited. Even before Columbus, cultures discovered that chocolate’s high fat content could sustain like no other portable food. It became a staple to the military from Montezuma’s troops through today’s U.S. military rations.

Nevertheless, manufacturers by the turn of the nineteenth century began to make more assertive efforts to control the high level of cocoa butter. Large industrial chocolate operations such as Fry and Cadbury in Britain added flour or another starch to counteract the fatty nature of cocoa. The resulting thicker drink grew to appeal to British tastes, and even after starch was rejected as an adulteration during the pure food movement of the 1850s, some manufacturers continued to add it through the entire nineteenth century (Oddy and Miller 1976). But starch was a way to mask cocoa butter, not remove it. In 1828, a Dutch chocolate seller discovered a better solution that soon would revolutionize the cocoa industry.

Using a cider-like press, Caspardus Van Houten was able to squeeze cocoa butter from the mass, collecting it separately to leave a firm cake that could be ground to cocoa powder. The powder still had some residual fat, 10–15 percent, but the oily nature of the drink no longer dominated. The *molinillo*-equipped chocolate pots were to become obsolete.

Separating the cocoa butter sparked possibilities beyond simply leaving a less greasy cup of cocoa. Fry and Sons of Britain, one of the world’s first large chocolate manufacturers dating from the 1700s, experimented with van Houten’s cocoa and its residual cocoa butter. Could just part of the cocoa butter be returned to the cocoa powder? A controlled amount of fat would make possible a chocolate product that could be molded into a stable shape. While chocolate in what was then called a cake had always been available, it resembled the consistency of hard peanut butter, and somewhat gritty. The cake was nearly always grated into a liquid, usually water, and mixed with sugar and spices for a drink. In 1847, Fry introduced chocolate in the form of a solid bar. The new product could be eaten as is or melted and molded into not only more bars, but just about any shape limited by a chocolatier’s imagination. The handy and increasingly inexpensive confection grew to become the ideal way to feature edible bunnies, soldiers, castles, bonbons, or miniature Napoleons.

Fry could now control the cocoa butter, and so the product no longer needed starch. But the company was slow to remove the additive from its drinking chocolate. Some British chocolate drinkers preferred a thick slurry. But an 1851 report by British physician and food safety advocate Arthur Hill Hassall, *Food and Its Adulterations*, specifically targeted Fry and other cocoa firms for adding starch. His analysis of Fry’s cocoa powder indicated, in addition to sugar, starches including potato flour, arrowroot, and sago (Hassall 1855). Fry defended itself, saying the starch was in no way an adulteration but in fact improved the product. But as cocoa butter could now be controlled, it was no longer an attraction, and the pure food movement in Britain saw manufacturers remove it as an adulteration.

While Van Houten’s cocoa press was patented, and therefore slow to reach across the industry, another firm, Ghirardelli of San Francisco, was able to extract

it in a different way. Hanging a bag of cocoa mass in a warm room, they discovered the cocoa butter would melt and drip to a separate container. Ghirardelli sold the remaining lower-fat product beginning in 1867 as Broma cocoa powder (Grivetti and Shapiro 2009). Some evidence shows earlier chocolatiers had also used the process to obtain cocoa butter although apparently did not advertise it.

The growing ability to reliably extract cocoa butter made possible its use for other purposes, medical or not. On the medical side, the butter became a favored suppository for hemorrhoids. Chocolate as such a treatment was described as early as 1552 in the Badianus manuscript of traditional Native American medicine (Thompson 2015). The French novelist Marquis de Sade asked for cocoa butter in jail for, among other things, its similar soothing quality (Coe and Coe 1996).

As cocoa butter became more common in the nineteenth century, it saw growing favor as a treatment for skin conditions and so often was available in pharmacies. Today the almond-colored cocoa butter is still a featured ingredient in cosmetics, and for that purpose is actually more valuable sold separately from the cocoa. Sometimes manufacturers deodorize it with steam, as the product otherwise retains a slight smell of chocolate. Cocoa butter has become a familiar home remedy as a moisturizer in skin creams, lotions, and lip balms. It is available in stores and online as soap, antiaging cream, protection from sun damage, and treatment for stretch marks from pregnancy. It also is sold as an over-the-counter treatment for psoriasis and eczema. Raw cocoa butter is solid at room temperature, although it melts at just below body temperature. Consumers can also buy it in blocks to make their own skin treatments. However, research is limited regarding actual effectiveness of cocoa butter as a skin treatment or antiaging cream (Kandola 2019).

While cocoa-butter-based skin products should not be consumed as they may contain other additives, pure cocoa butter also is sold as a confection. The fat has no chocolate taste on its own. It is usually combined with milk powder, sugar, and vanilla to be marketed as white chocolate. This confection does not have caffeine-like theobromine for those who are sensitive but also has few of chocolate's antioxidant compounds that have been promoted for health (Meng, Jalil, and Ismail 2009). As a pure vegetable fat, cocoa butter is hardly a food for dieters, with 120 calories in one tablespoon, 13.6 grams ("Nutrition Value" 2021). The fat, however, is mostly stearic acid. Studies have shown this does not elevate cholesterol and as a monosaturated fat is considered desirable (Magee n.d.).

White chocolate is a somewhat recent chocolate-based confection, introduced in the 1930s by the Swiss company Nestlé. Was this new product really chocolate? Until 2002, the U.S. Food and Drug Administration said no, that it must be labeled "white confectionary coating." But following lobbying from large producers, the law was changed to allow its labeling as "white chocolate" (Szalay 2018). Its former designation as a confectionary coating did make practical sense, as *couverture*, the product chocolatiers use as a coating, contains a higher percentage of cocoa butter to obtain better flow.

The peculiar tendency of cocoa butter to crystallize in unattractive ways has challenged the industry since chocolate became popular in bar form more than a century and a half ago. The solution was tempering. The tempering process raises

the temperature of chocolate to melt the cocoa butter crystals. The mass is then slowly cooled to encourage crystals to reform in a way that leaves the confection with a pleasing glossy look, satisfying snap, and longer shelf life (see **Tempering**). The crystal that is stable at room temperature, called Form V, may be seeded into the chocolate as it is cooled to encourage proper crystal formation (Gordon 2007; Giller 2017; Fine Chocolate Industry Association n.d.). Poorly tempered chocolate or chocolate that has been stored in a warm place will encourage fat bloom, a dusty whitish deposit. A similar bloom can be the result of moisture attacking the chocolate in storage. Both are still edible, though unattractive in appearance and mouth feel. Fat bloom can be repaired by retempering. Sugar bloom cannot be fixed (Gordon 2007).

The high value of cocoa butter for cosmetics has encouraged some chocolate bar manufacturers to replace some of it with cocoa butter equivalents (CBEs). Most common are palm oil and coconut oil, though shea butter use is increasing. These do not have a unique feature of cocoa butter—a melting point of just under normal body temperature. The melt-in-your-mouth satisfaction of chocolate is compromised. Some detractors say CBEs also leave a greasy mouth feel. The fine-chocolate industry considers the use of CBEs to be an unacceptable substitution. CBEs actually became the focus of a multiyear disagreement, called the European Chocolate War, as European Union standards forbade them while British, Irish, and Danish firms traditionally included small amounts of vegetable fat that they argued improved the product. A final compromise allowed up to 5 percent, but only if labeled with the specific CBE used. In Europe, the product could still be called chocolate, however. This was not true in the United States. FDA regulations did allow CBEs, but the product was required to be labeled, “chocolate flavored coating” (Nieburg 2013).

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Cocoa Powder

By the turn of the last century, cocoa in powder form was sold as one of three products made from the cocoa bean. The other two available to the chocolate fan of 1900 were bars of dark chocolate and bars of milk chocolate. The manufacturing process for all three began, however, with a form of powder, the basic extraction from the bean since pre-Columbian days of Mesoamerica. But "powder" then was not the same as "powder" now. "Cocoa powder" today can mean 100 percent cocoa for cooking or nearly 0 percent cocoa for a processed drink.

Terminology also differs. "Cocoa" normally refers to the powder and "chocolate" to the bar, but cocoa powder can become a bar, and hot chocolate in a mug usually begins with cocoa powder.

Historical development of the *Theobroma cacao* can help slice through the confusion. Seeds from cacao tree pods during most of history were fermented, roasted, crushed, and finely ground on a heated stone (*metate*) into a paste. The cooled chocolate was formed into pasty cakes for shipping and storing. These would be grated to make a drink but seldom eaten on their own.

The chocolate tasted a bit gritty, as hand grinding could not reduce the particles to the less than 30 microns that we expect for a smooth product (Beckett 2000). And it was high in fat. Cocoa beans (the seeds after fermenting are no longer viable so become beans) are naturally about half fat. As this cocoa butter melts just below body temperature, a little heat during grinding turns the cocoa mass into a consistency resembling thick peanut butter. In traditional hand processing that dried to a crumbly consistency that could be stored but not easily molded. Hand processing also could not remove the globules of fat, though it could be skimmed from the top of a drink, whipped, or poured between containers to mix. It could also be disguised by adding starch for a thicker beverage. With the addition of sugar and spices, this was the base for chocolate that became a popular drink in Europe for two centuries, beginning in the early 1600s.

This cake form was not cocoa powder as we know it today. To achieve a lower-fat product, about two centuries ago a Dutch chemist and chocolatier tried mechanically pressing the cocoa mass to squeeze the cocoa butter from the solids.

Casparus Van Houten's process left a firm block of about 10–20 percent fat (instead of 50–60 percent). That could be ground into a powder. Van Houten called the result cocoa powder. His patented process in the next two decades slowly grew to replace handmade cocoa and made the old chocolate pots with swizzle stick (*molinillo*) obsolete.

Cocoa powder by itself was an attraction for its ability to produce a beverage without the globules of fat, but chocolate's increasing attraction grew from further nineteenth-century innovations. Van Houten's son Coenraad responded to two aspects of cocoa that continued to limit its appeal to general consumers. One, traditional cocoa was somewhat bitter. Its natural pH is about 5–6. Two, it did not mix easily with water. Pre-Columbian natives tried to neutralize the acid with wood ashes. They were onto something: ash is an alkali. Van Houten considered instead the possibility of treating cocoa with a chemical alkali, usually potassium carbonate, to reduce the acidity and help it mix more easily. The process, today called Dutching after the country of its invention, increases cocoa pH to about 7. Its taste is more mellow and its color is darker. It helped the cocoa powder mix more easily with water, although sometimes today soy-based lecithin is also added mostly for its quality as an emulsifier (Velie 2019; Van Houten n.d.).

Some chocolate purists disliked Dutched cocoa powder, but generally its milder flavor appealed to popular tastes. Demand for chocolate ballooned. For baking, however, Dutch-processed cocoa alone is not acidic enough to react with baking soda, and so it must be leavened with baking powder. Heavily Dutched chocolate becomes darker and darker, finally turning to “black cocoa powders.” It is favored today for the iconic Oreo cookie (Gordon 2007).

Cocoa powder as a true powder and not a greasy cake would become the basis of hot chocolate we know today, much of it Dutched. (Van Houten brand cocoa powder is still available, now owned by Barry Callebaut.) But in Van Houten's cocoa powder Victorian-age manufacturers discovered another advantage—and it was one that would revolutionize the use of chocolate in Western society. The partially defatted powder could be remixed with sugar and cocoa butter to produce a stable, moldable bar. The British manufacturer J. S. Fry in 1847 was first to produce chocolate as a snackable bar. Molded chocolate in such a handy form grew to huge success: in 1869, Fry employed 250 workers, by 1896, 4,500. Despite its success with its wildly popular bar, Fry continued to produce a powder it sold as Pearl Cocoa. The inexpensive drinking chocolate contained arrowroot, a starch to help absorb the traditional fatty product. It was favored for those who liked the old-fashioned thick beverage (Quakers n.d.). But with the beginning of Britain's pure food movement of the 1850s, Fry's continuing defense of starch for its cocoa powder became a liability. In the nineteenth century's fierce competition among large manufacturers of confections, rival British firm Cadbury finally came out on top and merged with Fry in 1919.

The popularity of making a cheaper, milder, and more convenient chocolate in bar form that began with Fry ended, at least for the mass popularity of chocolate, with Daniel Peter and Henry Nestlé of Vevey, Switzerland. Manufacturing innovations had solved old issues of bitter taste and fatty appearance. The conching process (see **Conch**, **Conching**) introduced in 1879 soon reduced the gritty mouthfeel and enhanced the flavor. The confection could be even smoother, and the taste

even more attractive, at least to some makers, by adding milk. But natural chocolate will not accept moisture; the water reacts to form a paste. Milk is 87 percent water. While it could be the basis for a drink, milk in chocolate as a bar was not publicly available until 1879. In that year, Peter introduced a milk chocolate bar incorporating a form of Nestlé's milk powder originally sold as baby formula. Peter's invention, called milk crumb, combined dried milk with sugar to produce a substance that would not spoil like milk and could be incorporated in moisture-intolerant cocoa powder. It proved even more popular than Fry's invention. Milk chocolate in bar form by the turn of the twentieth century was becoming the dominant way most of the world consumed chocolate. And until a recent rebirth in popularity of dark chocolate for its possible health benefits, chocolate to the average consumer meant milk chocolate. Big manufacturers turned their attention to the quality of milk instead of the quality of cocoa beans. In 1905, British giant Cadbury introduced its Dairy Milk, boasting the equivalent of a glass and a half of milk in every eight-ounce bar. It became Cadbury's most popular product sold worldwide (Mondeléz International. n.d.). In 1905, Milton Hershey introduced his milk chocolate five-cent Hershey Bar. It grew the company into an American icon.

Cocoa powder today is available at all levels of quality for drinking and baking. Sometimes varieties are interchangeable. Sometimes they are not. As noted, Dutched (alkalized) cocoa powder will not produce the carbon dioxide to leaven some baked goods made with baking soda. Another acidic product, such as buttermilk, lemon juice, brown sugar, molasses, or cream of tartar can replace it, however (Baker Bettie n.d.). If, however, the recipe calls for baking powder, containing both acid and base, Dutched cocoa works fine. Bakers may prefer the Dutched product for its milder flavor and darker color. (A little lemon juice or cream of tartar also can substitute for the acid of natural cocoa powder.)

Some bakers begin with unsweetened cocoa powder so they can better control a measure of sugar usually part of recipes for baked goods. Cocoa powder sold as bittersweet or semisweet has no official definition, but by U.S. Food and Drug Administration regulation, they must contain at least 35 percent cocoa (the rest being mostly sugar). Manufacturers usually bring it to about 50–60 percent cocoa mass. Bakers may substitute unsweetened chocolate in recipes calling for bittersweet by substituting two-thirds ounce unsweetened for one ounce bittersweet, and adding two teaspoons of sugar (Demichele 2018).

Milk chocolate cocoa powder by FDA regulation may barely be chocolate at all: only 10 percent cocoa is required. Ample additions of milk and sugar, however, may produce a beverage with a creamy, sweet, slightly chocolatey mouth feel that has become so attractive to popular taste. Cocoa powder for a hot chocolate drink can vary from powder containing above 50 percent cocoa mass to hot chocolate mix containing little real cocoa. The latter is sold as "chocolate flavored" and contains mostly sugar, whey, milk powder, cocoa butter equivalents (such as coconut oil), artificial flavors, and other substances. Dutched cocoa powder for hot chocolate will be milder and darker than natural cocoa powder, an appeal to some but not all enthusiasts. And the chocolate-flavored mixes do have the benefit of offering a fast and reasonably satisfying drink easily mixed with hot water.

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Cocoa Shells (Drink and Garden Mulch)

Cacao seeds are encased in a husk, usually called a shell. It may be removed before roasting but often is removed afterward, as it shrinks and separates from the bean and can be winnowed. The bean moves to the grinder. The shell usually moves to the dumpster. As worldwide cacao production in 2019–2020 was projected to reach 4.8 million tons, researchers have considered a better fate for the shells, which perhaps deserve more respect for their value not only in horticulture but also in food and drink.

Typically, cocoa shells (cacao husks until after roasting) are burned for fuel at the roasters or discarded. But consumers in centuries past valued the shells, particularly in colonial America. Records show George Washington as early as 1757 ordered chocolate to serve at his Mount Vernon home. He continued to order regularly from one to fifty pounds, served mostly as a breakfast beverage. But Martha Washington reflected a taste common at the time that did not like the fatty chocolate. Instead, she liked the lighter beverage made from cocoa shells, called “little coffee,” as a poor man’s drink in the Low Countries during the eighteenth century. Roasted cocoa shells were steeped like tea or boiled with milk, sugar, and cinnamon for a beverage that retained the stimulating bitterness of coffee and a slight chocolate flavor (Squicciarini and Swinnen 2016).

Martha Washington’s preference for cocoa shell tea has been well documented, as it was served alongside the usual chocolate for breakfast. A letter from Burges Ball, Washington’s nephew, dated February 13, 1794, requested from Mount Vernon “two or three bushels of chocolate shells such as we’ve frequently drank chocolate of at Mt. Vernon. My wife thinks it agreed with her better than any other breakfast” (Mount Vernon n.d.).

During the same century, some makers also ground the shells and added the powder to cocoa to extend the more expensive product. This form of filler became



Husks from roasted cocoa beans, normally called shells, generally have been discarded or used as garden mulch. However, cocoa shell tea has sometimes attracted interest. For centuries it replaced more expensive cocoa, but even the wealthy sometimes preferred it. Martha Washington served it for breakfast along with the more typical cocoa. (Heike Rau/Dreamstime.com)

part of the list of offensive adulterants compiled by Arthur Hill Hassall in his influential report to the British Sanitary Commission published in 1855. Pressure from supporters of the pure food movement in Britain and other countries led manufacturers to remove the ground shells from their cocoa powder (Hassall 1855).

By the twentieth century, cocoa and coffee had become inexpensive beverages, and little interest remained in cocoa shell tea. Shells today, if they are not thrown away, usually become garden mulch. Cocoa shell mulch sold at most nurseries enriches the soil, keeps weeds away, and offers a slight chocolatey aroma and attractive dark appearance in the garden. A danger, however, is that chocolates, and also the shells, are toxic to many animals, most significantly dogs. Chocolate shells, like chocolate, contain little caffeine. But both do contain theobromine, an alternative stimulant that is milder than caffeine but still has the effect attractive to some, repellant to others, and toxic to dogs. (Dark chocolate contains about 2–3 percent theobromine; milk chocolate retains much less. See **Caffeine/Theobromine**.)

Some gardeners consider the risk of dogs getting sick or even dying after consuming cocoa mulch to be slight. Still, dog owners are aware that some pets will try almost anything, whether or not it appears edible. While the American Veterinary Medical Association have noted the chance of serious illness from shell chow is low, still, homeowners are advised to take care, particularly with small dogs or

puppies, and to check with mulch manufacturers regarding how the product was manufactured (Baldwin 2020).

Cocoa shells for tea are still commercially available, sometimes marketed with the Martha Washington mystique. Shells ground with cocoa nibs also are sold as a coffee substitute. As a possibly healthy beverage, cocoa shell tea does have its attractions. It is rich in protein and fiber and contains some of the same possibly healthy compounds, notably phenolics touted for antioxidant qualities (Meng, Jalil, and Ismail 2009). Beyond tea or mulch, proponents say the shells now going to waste could be used for biofuel or ground for flour. It also is a source for pectin. Theobromine extract may be used in the pharmaceutical industry as it is a diuretic, vasodilator, and stimulant. And brewers can add the shells for an unusual chocolatey flavor in beer (Balentic et al. 2018; Kunisuke et al. 2010).

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Colmenero, Antonio de Ledesma

Five centuries of books addressing the charms of chocolate could fill a large library. But one of the greatest best sellers goes back to the dawn of chocolate's introduction to the European and North American palate. In fact, Antonio Colmenero de Ledesma probably lit the fire under the explosion in popularity of chocolate in Europe by the later 1600s.

A Spanish physician from Andalusia, Colmenero may have been a *converso*, a Spanish Jew converted to Christianity (Grivetti and Shapiro 2009). The conversion possibly was coerced, as was often the case in Spain during this period in which Jews were in peril of persecution or banishment. In any case, his introduction to cacao and its products apparently came during his service as a medical

doctor on a Jesuit mission to Mexico (Jones 2013). Colmenero returned to Madrid where, in 1631, he published a small book investigating the benefits and preparation of chocolate based on the Galenic medicine of the era. The original Spanish-language edition was ambitiously entitled, *Curioso Tratado De La Naturaleza Y Calidad des Chocolate, dividido en quatro puntos. En el primero se trata, que sea Chocolate; y que calidad tenga el Cacao, y los demas ingredientes. En el segundo, se trata la calidad que resulta de todos ellos. En el tercero se trata el modo de hazerlo, y de quantas maneras se toma en las Indias, y qual dellas es mas saludable. El ultimo punto trata de la qualidad, y como se ha de tomar, y en que tiempo, y que personas* (Biblioteca Nacional de España 2011).

Colmenero's treatise proposed to consider the health benefits of chocolate using the humoral system universally accepted by European medicine. Under the ancient philosophy, all substances were classified based on the four humors of Hippocrates (c. 460–370 BC): blood, yellow bile, black bile, and phlegm. Treatment would suggest substances categorized in one of four categories, hot, cold, wet, or dry, could correct an imbalance in the humors that caused illness. The key to medical knowledge was understanding the quality of the substance.

Until the introduction of New World foods unknown in ancient Greece, categories had become mostly well accepted and uncontroversial. Then came the cocoa bean, and its product, chocolate. How should chocolate fit into the humoral theory? As a physician, Colmenero weighed in. He declared that the astringent cocoa bean was cold and dry, though it also could be wet and hot, similar to milk. His conclusion was disputed. Chocolate contained cocoa butter, a fat that would be presumed hot and wet. But its astringency was cold and dry (Colmenero [1631] 1652). A centuries-long medical controversy ensued that probably added to the final discredit of Galenic medicine: chocolate just would not fit the system, and if it did not, then perhaps the system was at fault.

Colmenero seemed less concerned about humoral classification than arguing the beneficial properties of the drink. He noted that he had been introduced to it while visiting the sick in the New World. Requesting water, he was instead given a *jicara* (gourd cup) of chocolate. He found it refreshing (Norton 2006). In his subsequent book, Colmenero argued against chocolate's detractors, declaring the beverage wholesome and health-giving. His introduction (English translation of 1652), observed: "I thinke fit to defend this *Confection*, with Philosophicall Reasons, against any whosoever will condemne this Drinke, which is so wholesome, and so good, knowing how to make the Paste in that manner, that it may be agreeable to divers dispositions, in the moderate drinking of it" (Colmenero [1631] 1652). Colmenero further stated that he would help introduce the beverage to Europe by including chocolate's qualities, ingredients used in its preparation, recipes, and drinking customs from the New World (Colmenero [1631] 1652).

Colmenero's original 1631 book burst upon Europe to become a Renaissance best seller. But it was hardly the first time anyone had set in writing the qualities of cocoa. Two of the most important works, by Sahagún and Badianus (see **Badianus Manuscript**), that included extensive descriptions of cocoa and its health benefits were published in the 1500s. These, however, were almost unknown to Europe during the next century. Nor apparently was work by

Juan de Cárdenas (Jones 2013; Norton 2006). Colmenero's small book instead took the Old World by storm. Most subsequent works covering chocolate were based on Colmenero, either acknowledged or not. English physician Henry Stubbe in 1662 wrote, "I have set down the ways of Ledesma, and Zacchias, and the way by which the chocolate is commonly made" (Stubbe 1662, Preface; Stubbe may be referring to Paolo Zacchia, a Roman physician who in 1655 published work emphasizing chocolate as a digestive aid; Segan 2018). In France, Sylvestre Dufour's 1671 book, *De l'usage du caphé, du thé et du chocolat*, borrowed from Colmenero, as did his near contemporary, Nicolas de Blégny (Dufour 1671). René Moreau, director of the faculty of medicine in Paris, was a relative of Colmenero, and in 1643 translated his work with annotations into French (Bibliothèque Nationale de France n.d.; Jones 2013). British cleric Thomas Gage's 1648 account of his experience with chocolate in the New World also relied on Colmenero for chocolate's health benefits. Gage wrote: "Chocolatte being this day used not only over all West India's, but also in Spain, Italy and Flanders, with approbation of many learned doctors of physic among whom Antonio Colmenero of Ledesma; (who lived once in the India's) that composed a learned and curious treatise concerning the nature and quality of this drink" (Gage [1648] 1677, 238).

Moreau's French translation of 1643 was first in France. But an English translation had appeared three years earlier, by James Wadsworth, who published the first edition under the pseudonym Don Siege de Vadesforte (Jones 2013).

Wadsworth's 1652 translation under his own name retained Colmenero's extravagant approach to titling: *Chocolate; or, an Indian Drinke. By the wise and moderate use whereof, health is preserved, sickness diverted, and cured, especially the plague of the guts, vulgarly called the new Disease; fluxes, consumptions, & coughs of the lungs, with sundry other desperate diseases. By it also conception is caused, the birth hastened and facilitated, beauty gain'd and continued.* Wadsworth's apparent effort to promote use of the beverage was reflected in the publisher's note: "Printed by J.G. for Iohn Dakins, dwelling neare the Vine Taverne in Holborne, where this Tract, together with the Chocolate it selfe, may be had at reasonable rates" (Colmenero [1631] 1652).

Colmenero in Latin translation appeared in 1644, translated by Marco Aurelio Severino: *Chocolata Inda. Opusulum de Qualitate & Natura Chocolatae* (Nuremberg). An anonymous Italian translation appeared in 1678, *Della Cioccolata: Discorso d'Antonio Colmenero Medico Dell'Andaluzia* (Venice) (Jones 2013). It soon was translated into nearly every Western European language (Albala 2007). Colmenero's work by the end of the century had become the reference, and the Spanish became authorities about its preparation (Loveman 2013).

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Conch, Conching

More than most plant-based foods, chocolate comes to us as a manufactured product. It always needed some kind of treatment: the seeds from a cacao pod surrounded by a sweet whitish pulp do not appear to have any edible attraction. Early natives who discovered the cacao tree growing wild in South America apparently did not consume the seed. Then, perhaps on some misty morning of prehistory, a native accidentally or on purpose roasted seeds that had become beans from natural fermentation. The result must have been cracked or ground and added to water as a beverage. Natives had discovered chocolate.

But from the beginning, the process required at least four steps after harvest: fermenting, roasting, winnowing the husks, and grinding. From ancient times, chocolate was a manufactured product, though the process was done by hand using special equipment, most notably a stone *metate* for grinding.

Europeans encountered chocolate as a beverage in the early 1500s, at the very beginning of colonization in the Americas. They eventually added sugar and other ingredients to change the taste. But they did not radically change the processing steps until nearly three centuries later. Chocolate in Europe grew to rival in popularity two other new contemporary beverages, coffee and tea, despite its comparative disadvantages. The tedious processing required helped to make chocolate a rather expensive luxury mostly available only to those with means. And chocolate as a drink came to the pot with globules of cocoa butter, that is, fat, floating at the top. A chocolate pot with swizzle stick called a *molinillo* mixed the drink, or the server skimmed off the fat. Also a downside, chocolate was quite gritty no matter



The procedure of working chocolate for hours or days to produce a smoother, less bitter product did not become common until the end of the nineteenth century for obvious reason. The idea is not intuitive, and until mechanization could not be accomplished anyway. Legend tells us that Rodolphe Lindt discovered it by accident. Today most chocolate is treated in this way to some degree. (Fjmolina65/Dreamstime.com)

how much it could be ground by hand, and its pronounced bitter flavor put off some who preferred a more mellow product.

The nineteenth century brought inventions that addressed nearly all the complaints. In 1828, a mechanical press reduced the cocoa butter to leave a dry cocoa powder. A few years later Dutching, an alkalization process, helped tame the bitterness and emulsify the powder. In the 1870s, the successful addition of milk produced a smooth, mild drink or snack that anyone could afford.

The last great invention of that century addressed one continued complaint of bitterness or off flavors, and slight grittiness. But that invention stayed a secret for more than twenty years, to the consternation of worldwide manufacturers, including Milton Hershey.

David Sprüngli-Ammann in 1845 produced a solid bar of chocolate—the first in Zurich, Switzerland, where he and son Rudolf opened a factory in 1847. Chocolate in bar form grew in popularity after Fry's introduction in Britain, also in 1847,

but complaints of the slight grittiness and bitterness remained. Rodolphe Lindt, a pharmacist's son who opened a small confection shop in 1879, sold chocolate bars no better than Sprüngli's, but he was not content with the consistency and taste. Lindt's (possibly apocryphal) story tells that one Friday he left the factory without turning off a mixing machine. He did not return until Monday. On discovering that the machine continued to work the chocolate through the entire weekend he noticed the resulting product had changed, but in a good way. It had become silky smooth—the grittiness was gone. And the taste was less bitter and more refined (Lindt n.d.). Lindt had discovered that the secret to the process required something not possible before the machine age: an ability to work the chocolate mass for literally days without stopping.

Lindt designed a processing machine he called the *conch* originally for its shape based on the seashell. It is often today spelled *conche*, with an “e.” In German, a conch is a *Muschel*; as Lindt's operation began in Bern, a German-speaking city in Switzerland, usage of apparently the English term for his invention is uncertain. Some chocolate writers indicate it is actually based on the Spanish word, *concha* (Chocolate Alchemy n.d.). It also may be related to the Latin word, also *concha*, though that also does not have the final “e.”

In any case, the machine has often grown to large scale in modern chocolate operations, processing many tons of chocolate; Barry Callebaut's gigantic operation in Wieze, Belgium, produces 340,000 tons of chocolate a year (Confectionary Production 2018). But as originally designed, it comprised a simple granite roller inside a granite trough with raised edges. As the roller moved from one edge to the other the chocolate mass melted and folded around the roller and back from curve to curve. Conches today usually heat the chocolate mass to about 122°F (50°C) for milk chocolate. Dark chocolate is conched at about 158°–180°F (70°–82°C) (Afoakwa et al. 2008). More expensive chocolate may be conched up to seventy-two hours. While conching is today the industry standard, baking chocolate is often not conched, as its benefits are not required for cooking (Gordon 2007).

Lindt kept his apparently accidental discovery to himself for two decades, becoming one of the biggest trade secrets of the late nineteenth century. But while he knew it worked, what Lindt did not know was why it worked. Why does conching leave the chocolate looking and tasting better? Today we have research to help guide us, though some magic still has not been unmasked. We know that conching mills particles to smaller than 30 microns and coats them with cocoa butter (fat) so that they glide more smoothly in suspension (Beckett 2000). The result is a velvety texture. The taste also becomes what might be described as less bitter and astringent, and more mellow. We can presume this is because conching drives off unpalatable compounds, but what does that mean exactly? Recent research indicated that conching eliminates volatile acids, removes moisture, modifies sugar crystals and viscosity, and changes color by emulsification and tannin oxidation. Precursor flavors developed during fermentation and roasting are changed to achieve a final flavor with lower acid and astringent taste (Afoakwa et al. 2008). The change, then, is complex and hard to define. Most distinctive to someone who has spent time around large conch operations is the vinegar smell.

This suggests that acetic acid, a product of fermentation, is driven away to produce a finer flavor. But as research has identified more than six hundred volatile compounds in chocolate, the precise benefits of kneading the product with a roller for several days is still not completely understood (Afoakwa et al. 2008).

Lindt called his silky new product *chocolat fondant*, or melting chocolate. But the secret process behind it did not reach the general chocolate manufacturing community until after the turn of the twentieth century. In 1899, the firm now run by Lindt's sons joined with Zurich chocolate manufacturer David Sprüngli's large operation in Kilchberg-Bendlikon to keep up with high demand. Lindt's conching secret came to Sprüngli at a high price, however, reputedly 1.5 million gold francs (Lindt n.d.). The secret eventually came out, and today most chocolate goes through some kind of conching process. Swiss chocolate, however, still holds its reputation for special attention to the process it originated, along with its invention of milk chocolate.

One of those early manufacturers keen to find out the Lindt process was Milton Hershey. He worked with his staff to come up his own alternative to Swiss conching. The result was a bar some said had a somewhat sour note. That may have been related to residual acetic acid we know today to be driven away by Lindt's conch. Critiques also said Hershey's product had a grainier texture (Squicciarini and Swinnen 2016). Regardless, the five-cent Hershey Bar unveiled in 1905 became America's benchmark mass-market definition of milk chocolate.

Lindt & Sprüngli in 2020 was the world's seventh largest chocolate manufacturer (ICCO 2020). It has made efforts to widen its market of well-conched premium dark chocolate to the United States in an attempt to attract Americans to a more European style. Lindt chocolate in 2021 was available in most U.S. grocery stores. In 2012, it launched the "Hello" line aimed to introduce premium chocolate to children (Squicciarini and Swinnen 2016). Labels designed for kids' appeal include informal descriptions such as, "Hello, My Name is Caramel Brownie. Nice to Sweet You. Pleased to Meet You."

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Conferences

See Festivals and Conferences

Cortés, Hernán

Hernán Cortés (c. 1485–1547), the most famous Spanish conquistador in the New World still seems as controversial today as he was in the early 1500s. The disagreement even extends to his importance in the promotion of chocolate. What is beyond dispute is his ambition to seek a fortune from the growing Spanish colonies in what is now Central America. Born in Medellín, Spain, Cortés set off at age nineteen to find a fortune in Mexico. There and in Cuba, he served the Spanish colonial government. He returned from Spain to Mexico in 1518, this time with five hundred men and eleven ships aiming to conquer the Aztec Empire (Biography 2021). Cortés had been forbidden by the Spanish government to do that, but ignoring authorities, he marched to the Aztec capital in 1519. He was received as a guest, took Montezuma hostage, plundered the city, fled when he heard Spanish military were coming to arrest him, returned in 1521 with a coalition of Indigenous peoples, and overthrew the sprawling Aztec Empire. During that conquest, up to 100,000 Native Americans were killed.

As a reward, the Spanish king appointed Cortés as governor of New Spain in 1522. But the conquistador's goal was not to solely to conquer. It was to get rich by conquering. He quickly discovered that a way to do that was to grow cacao. It was not, apparently, a totally new product to Cortés; one of the officers who accompanied Cortés to his first meeting with Montezuma described the court consuming a drink from the cacao tree. Bernal Diás del Castillo said he observed chocolate as part of Montezuma's sumptuous feast: "After the monarch had dined, dinner was served up for the men on duty and the other officers of his household, and I have often counted more than 1000 dishes on the table, of the kinds above mentioned. These were then followed, according to the Mexican custom, by the frothing jugs of cacao liquor; certainly 2000 of them, after which came different kinds of fruit in great abundance" (Diás del Castillo [1568] 1844, Volume 1, 231). Cortés and his men were apparently offered some cacao but refused because, as witness Diego Durán wrote, they viewed it with suspicion (Norton 2006).

But Cortés observed that the Aztec Empire had established an elaborate system of tribute based on cocoa beans. Mesoamerica attached great value to the beans, sometimes even using them as money. Cortés wrote to the Spanish Crown that he had procured a grant of land on the Pacific coast to grow two thousand cacao trees. He told Charles V that the almondlike fruit could be a valuable commodity (Presilla 2009). The letter from Cortés is among the earliest evidence we have for cacao's introduction to Europe, although some research suggests the earliest date was a letter to Charles V dated October 30, 1520. In any case, it predated the conquest of 1521, indicating that from an early date Cortés was aware of cacao and its value. We can surmise it played a role in the attraction of conquest, as shortly after that Cortés set out to explore the maze of trails on which cocoa beans reached Tenochtitlán for tribute (Mcanany and Murata 2007).

It would stand to reason that Cortés also was first to send actual cocoa beans back to Spain, introducing the food to Europe. (Recent research finds little evidence that Columbus tasted chocolate or brought back beans in his earlier explorations.) Cortés's return to Spain in 1528, according to some historians, included cocoa beans and an Aztec recipe for their preparation (ICCO 2017; Académie du chocolat de Bayonne n.d.). He may have even brought cocoa beans back as early as 1519. It would seem plausible, as he apparently had already begun establishing his cacao plantation. Research by Coe and Coe (1996), however, showed no mention of cacao on Cortés's ship manifests from either date.

We do not even have evidence that Cortés actually tried the drink. While it has been suggested that Cortés wrote down a secret Aztec cocoa recipe (Giller 2017), it included cinnamon and sugar. The Aztecs did not know about either of those foods introduced by Europeans. However, we do have evidence that early Spanish colonists found Aztec cocoa's bitterness distasteful: a drink for pigs, as one early trader famously declared (Fiegl 2008; Norton 2006).

But surely a cacao plantation owner like Cortés would consume his own product? Not necessarily. Cacao needs processing to become chocolate; consumers cannot just pull off a pod and start chewing like an apple. Many African cacao farmers even in 2021 had never actually tasted chocolate. To Cortés, it was a commodity for personal enrichment.

So, can historians give Cortés credit as the first European to taste chocolate and to introduce the cocoa bean to Europe? It is possible, but we have no evidence. We do know he was well aware of its value, and likely the first European to operate a cacao plantation in the New World. We also can observe that as he is not remembered fondly by some historians who consider him to be a brutal and venal conqueror. Cortés did have a hand in establishing the pattern of cruelty, brutality, and forced labor that came to define the cocoa industry in the New World for the next three and one-half centuries.

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Cosmetics

The high fat content of natural cocoa beans has for centuries encouraged their external use to enhance skin health. One early topical remedy mentioned in the 1552 Badianus manuscript of native treatments indicated the pasty cocoa mass could treat hemorrhoids. But the invention of a mechanical press in 1828 to easily separate the cocoa butter gave an expanded opportunity to pharmacists and others looking for skin treatments, as it isolated the supposedly healthy cocoa butter (Dillinger et al. 2000; Grivetti and Shapiro 2009). Effectiveness, of course, was anecdotal; while many physicians and others had taken a close look at the health benefits of chocolate as a food, few had taken a harder look at chocolate as a skin-care product.

Today we have research that backs up the benefits of cocoa-product use in the cosmetic industry. This includes use of the entire cocoa mass (liquor), cocoa butter alone, cocoa bean shells, and cacao pods. The attraction of chocolate relates to its antioxidant ingredients in the family of polyphenols. These compounds in food are thought to protect against inflammation, a possible source of many chronic illnesses. Early research testing chocolate's benefit as a so-called "superfood" for health encouraged dark chocolate consumption, although more recent research calls some of that into question. But as a skin treatment, polyphenols also offer a variety of benefits. Research for this use is not nearly as widespread, but as of 2020, it backed up some claims of cosmetic companies.

The growing body of scientific research supporting external use of cocoa includes a carefully constructed study that concluded cocoa butter's properties may protect against UV radiation-induced skin aging from the sun and even skin cancer. It may reduce the fine wrinkles of aging—or at least it did in hairless mice used in the research (Scapagnini et al. 2014). It can soothe psoriasis and other skin conditions, as it slows water loss from the skin. As a natural ingredient, it is about 34–36 percent stearic acid, 30–40 percent oleic acid, and 24–29 percent palmitic acid. Stearic acid leaves a silky feeling to skin and hair, and traps moisture to lubricate. It is commonly added to soap, shampoos, and household cleaners (3,200 of these products contain stearic acid) (Levy 2019). The U.S. Food and Drug Administration included cocoa butter on its list of substances generally recognized as safe (GRAS) and approved its use for over-the-counter skin products and "anorectal drug products." It seems that an early use of native peoples has been vindicated. The sodium cocoa butterate obtained from cocoa butter is used in soaps (Cosmetics Info n.d.).

Researchers also supported claims that cocoa waste on plantations could be beneficial in skin care. Cocoa pods currently discarded on the forest floor may

encourage plant disease but used as part of skin treatments they contain the same antioxidants as cocoa butter. This treatment did, in fact, also reduce visible wrinkles, according to the study (Abdul Karim et al. 2016).

Cosmetic use of cocoa butter has seen steady growth along with cocoa as a food. Manufacturers have responded to its apparent research-based benefits as well as its pleasant feel and long shelf life. Its low melting point is attractive to manufacturers of lipsticks and mascaras. It also is sold in chunks for home mixing, usually deodorized with steam to remove the slight fragrance of chocolate. While most cosmetics use the cocoa butter only, cocoa powder can be applied as a temporary self-tan: one recipe suggests mixing one small scoop of cocoa powder with one scoop of coconut oil, then massaging into skin (Kate n.d.; True Natural n.d.). As an exfoliant, ground cocoa bean shells can be added.

A wide and apparently growing variety of cosmetics include cocoa butter and other cacao products (Cosmetics Info n.d.; Vazquez 2020; CosmeticOBS 2011; Prance 2008; and retail product websites).

COSMETICS THAT INCLUDE COCOA BUTTER AND OTHER CACAO PRODUCTS

Body oils	Mascaras
Bubble bath	Massage oils
Cocoa butter (for home-based cosmetic recipes)	Moisturizers
Exfoliants and body scrubs	Perfume (“notes of bittersweet cocoa, Sequoia wood, sandalwood”; Vazquez 2020)
Face creams	Serum for mature skin
Face masks	Shampoos and conditioners
Face peels	Soaps (often including shea butter)
Lip scrubs	Stretch mark skin care
Lipsticks	Sunscreens
Lotions	
Makeup palettes with cocoa shades	

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Côte d'Ivoire

See Ivory Coast

COVID-19

See Pandemic of 2020–2022

Criollo

Varieties of *Theobroma cacao*, the botanical name of the cacao tree, began with the original Spanish colonizers in the New World. Their introduction to the cocoa bean almost certainly came from trees in Central America. Mesoamerican cacao served exclusively as the origin of Aztec chocolate. Early observers who described cacao, notably writers of the 1552 Badianus Manuscript and the 1576 work of Fernando Hernandez, would have known only one variety of cacao.

Complications arose with colonial exploration beyond Mesoamerica. Toward the end of their campaign to conquer the Peruvian Empire, the Spanish moved into Ecuador. Landing on the coast in 1532, Francisco Pizarro and 180 men began their quest for gold. The coast did not immediately accommodate their hopes, but the explorers did notice something else of value: cacao. Native cacao trees grew along the coast around Guayaquil (Frydenborg 2015). South American Indigenous peoples did not at this early date take interest in chocolate as did those of Mesoamerica.

But this cacao from South America looked different from the variety found farther north. The Spanish explorers labeled it as "foreign" to their accustomed variety, a stranger, a forastero. The familiar variety from Mexico became native born, or criollo (pronounced kree'owlow). These Spanish words classified two varieties of cocoa beans for the next two centuries. The South American native cacao, however, was considered inferior, bitter, and dry. Nevertheless, cultivation

of the forastero variety grew through the 1600s. As cocoa soared in popularity, the traditional criollo plantations in Mexico and Guatemala could not keep up with demand. Spanish colonizers looked to the Ecuadorian coast for a new source of beans. Guayaquil cocoa beans of the forastero variety began to reach Europe, though still considered lower in quality and needing more sugar to mask its bitterness (Coe and Coe 1996).

In the early 1700s, a third variety of cacao arose from a hybrid of the first two. Criollo plantations in Trinidad saw near-total destruction in 1727, probably caused by disease, although one early author blamed a hurricane. They replanted with a hybrid considered to be hardier and disease-resistant, pairing surviving criollo with what was then recognized as the more robust forastero (Presilla 2009; Morris 1882). The world now knew three varieties of cacao: criollo, forastero, and Trinitario. In 2021, the three still dominated most descriptions of cacao. The multinational food giant Cargill in 2020 described three types of pods: forastero, “known for its hardiness,” Trinitario, and criollo, most valuable (Cargill n.d.). But these simple designations are no longer botanically correct.

As early as the 1880s, British botanist Daniel Morris in Jamaica realized that the three common designations oversimplified the true extent of cacao and its hybrids. Morris observed that cultivation over centuries had yielded many more varieties, at least a dozen. Forastero, in particular, to him comprised eight varieties. Criollo, he determined, was still a separate variety. “Its yield, though small, is considered of great value,” he wrote. At that time that variety’s extent had shrunk to the point where it was mostly grown only in Venezuela (Morris 1882, 13). But Venezuelan criollo remained preferred; its cacao exports grew from 2.6 million pounds in the 1730s to more than 6.3 million in the 1770s, shipping both to Mexico and Europe. By the turn of the nineteenth century, Venezuelan beans conquered half the world’s cocoa; called “Caracas” cocoa in Europe (*Carack* in English), it was esteemed as among the highest quality (Korten 2017; Presilla 2009; Alden 1976). The fortunes of Venezuelan criollo began to fall as disease led to introduction of the presumably more robust forastero. Or was it forastero?

The new designations of Morris complicated cacao classification to the extent that most growers and manufacturers for convenience just retained the three centuries-old classifications. But in 2008, researchers led by Juan Motamayor reexamined the classifications to establish a more botanically accurate picture. Researchers found ten genetic clusters in the cacao germplasm (living tissue capable of generating new plants). Criollo survived the reclassification. Forastero was most inaccurate, as Morris had established nearly a century and a half earlier, as it comprised a number of varieties. The final reclassification of 2008 included these genetic groups: Marañon, Curaray, criollo, Iquitos, Nanay, Contamana, Amelonado, Purús, Nacional, and Guiana (Motamayor et al. 2008). Trinitario is now a hybrid of criollo and any other genetic strain that used to be called forastero (Giller 2017). Amelonado as part of the old forastero group shoulders the burden of global dominance, as it is the cacao supplied by farmers in Ghana and Ivory Coast, the world’s largest producers.

As for the coveted criollo, presumably the ancient variety known to Montezuma and his nemesis Hernán Cortés, research did not support much hope of

contemporary authenticity. Extensive hybridization had left ancient Criollos as a rarity in gene bank collections. A few were possibly cultivated in Central and South America, notably Venezuela and Columbia. But most are “modern criollos,” that is, a hybrid of other genetic groups. “Criollo has many meanings and interpretations,” the researchers observed. “It fetches the best price on the market, but that’s more due to rarity than subjective flavor” (Lachenaud and Motamayor 2017, n.p.). Criollo on today’s market, the authors concluded, is modern criollo, a hybrid. The International Cocoa Organization has concluded that almost no true ancient criollo trees remain, reflecting Motamayor and Lachenaud’s conclusions. Porcelana, a Venezuelan criollo most prized in the nineteenth century, still grows around Lake Maracaibo. Today it remains among the highest-price beans, featuring an unusual white interior (Presilla 2009; Gordon 2007).

Fine-chocolate connoisseurs argue that today’s criollo beans, pale yellow, require much shorter roasting times, and exhibit a nutty flavor with low bitterness and astringency. On roasting, they produce a light, reddish-brown chocolate. The pod is long-ribbed, thin-skinned, green until it turns red at maturity, unlike forastero cultivars which turn green to yellow (Presilla 2009; Lachenaud and Motamayor 2017; Cargill n.d.). Motamayor and Lachenaud argued, however, that flavor traits were based more on *terroir* (where the cacao is grown) than genetic origin (Lachenaud and Motamayor 2017; Afoakwa et al. 2008).

Cocoa beans designated as fine (as opposed to bulk) include criollo and Trinitario, and comprise about 12 percent of world cocoa production (ICCO 2020). Of that, criollo world production is difficult to gauge; authorities’ estimates vary from 5 percent (CBI 2020) to 0.001 percent (Campello and Pacchione 2016). Domori Chocolate of Italy has established a Venezuelan plantation to produce criollo. It indicated production of several criollo varieties. Notably, however, the name “criollo” is not regulated, and so inexpensive chocolate sold as “criollo” or “Porcelana” may need to be viewed with skepticism.

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Curtiss Candy Co.

See Ferrero Rocher (Italy)

D

Dahl, Roald

Probably the most famous, certainly the most beloved, but also a bit controversial, story about chocolate sprang from the imagination of the British adventurer, World War II pilot, and children's book author Roald Dahl. Dahl was born into the depths of World War I in 1916 to Norwegian parents who sent him to his Oslo relatives during summers. When he was four his father died, and so the now somewhat mischievous child ended up at a British boarding school. He skipped his mother's suggestion to attend Oxford or Cambridge and instead joined Shell Oil in Tanzania from 1932 to 1939. A plane crash as a Royal Air Force pilot during World War II left Dahl with serious injuries that required several surgeries (Biography 2021).

Dahl's most famous children's book, *Charlie and the Chocolate Factory*, was published in 1964. Dahl described his inspiration from his time at school, where he and other students became "taste testers" for a chocolate factory (Roald Dahl n.d.). The tale described the opportunity of five children to find the "golden ticket" and win a tour of the world's greatest chocolate factory. Willy Wonka, factory owner, admits five lucky children to the factory of marvels. But only one, Charlie Bucket, the poor child who barely could afford a chocolate bar, comes out of it without calamity. And because Charlie succeeds, his prize is the entire factory transferred to his ownership at Willy's retirement.

The book's fame rose after Gene Wilder played Willy Wonka in a 1971 now-classic film adaption, *Willy Wonka & the Chocolate Factory*, directed by Mel Stuart. In 2005, Tim Burton returned to the book for his production that kept the original name, *Charlie and the Chocolate Factory*. This time Johnny Depp played Willy Wonka. Other adaptations included *The Golden Ticket*, a 2010 opera composed by Peter Ash that opened in St. Louis, and a musical production in 2013 directed by Sam Mendes that opened at London's West End. Other productions were reportedly in the works as of 2020.

Directors, one would presume, had the privilege of dealing with a charming children's story that everybody would love. That is not quite correct. Dahl's original book included a description of his chocolate workers, the Oompa-Loompas, that critics considered racist. The 1964 text described the Oompa-Loompas as pygmies imported "direct from Africa," a tribe that had been starving until Willy Wonka saved them by promising to pay them in cocoa beans and smuggling them back to England in crates. Detractors found the description not only reflected discredited notions of colonial white superiority but also suggested that the Oompa-Loompas were actually slaves shipped surreptitiously to England in boxes (Yacovone 2018).

The idea of little Black people working for Willy Wonka did not fit changing attitudes by the early 1970s. In Stuart's film, the Oompa-Loompas became little people with orange skin and green hair—probably the depiction most people remember today. In Burton's film, they became little brown-skinned people. Dahl himself in subsequent editions of the book changed the African narrative, and so by the 1973 edition, they were depicted as rosy-white. Dahl, who had lived in Africa and was a product of a racist era, could perhaps be understood as he reportedly indicated genuine surprise that the original Oompa-Loompa story was considered racist (Flood 2017).

The book has been the source of considerable scholarship. While some critics have had little patience for what they believed was Dahl's imperialism and racism, others have emphasized an anti-racist theme in his earlier book draft. It originally featured a Black version of Charlie Bucket, the star character, who becomes trapped in a life-size chocolate mold—a metaphor for a Black stereotype. From the mold, Charlie ends up preventing a robbery and is rewarded. As chocolate marketing in the early twentieth century sometimes paired the idea of brown skin with brown chocolate, some critics argued that Dahl's original depiction showed a Black person uncomfortable at being locked in a racial stereotype. But Dahl's agent rejected the idea of a Black Charlie Bucket (Flood 2017).

Dahl died in 1990 of a rare blood cancer. *Charlie and the Chocolate Factory* by 2020 had sold twenty million copies worldwide, in fifty-five languages (Roald Dahl n.d.).

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Dark Chocolate

Dark chocolate (plain chocolate in the United Kingdom) had no need for specific designation until the last quarter of the nineteenth century. That is because all chocolate was dark; milk chocolate did not exist until Swiss chocolatier Daniel Peter discovered a successful formula in 1875. Milk chocolate subsequently skyrocketed in popularity, to the extent that for the next century it became what most consumers defined as "chocolate." Dark chocolate became unfashionable.

The older product regained the public's attention in the last decades of the twentieth century as renewed research on chocolate's health benefits indicated that antioxidants in chocolate could be good for you. But only if one consumed dark chocolate (Jafarirad et al. 2018).

In the 1990s, the fine-chocolate movement encouraged small manufacturers to offer “bean-to-bar” chocolate processes using the highest-quality cocoa beans (Ott 2014). Top-quality chocolate bars usually were considered to be dark chocolate, ideally with only two ingredients: cocoa mass and sugar. True connoisseurs, some claimed, eschewed milk chocolate (Giller 2017).

But what is “dark chocolate?” No legal definition exists. The U.S. Food and Drug Administration (FDA) and the European Union (EU) regulate chocolate quite closely. Milk chocolate in the United States must contain not less than 10 percent chocolate liquor by weight and not less than 12 percent milk solids by weight. It may contain additions including spices, nuts, or other seasonings. If it is Dutch processed (see **Alkali, Alkaline Salts**), that must be indicated on the label (FDA 2019).

While the FDA does not define dark chocolate specifically, it does strike close by defining chocolate liquor. This does not refer to an alcoholic drink; it is simply the viscous substance obtained from grinding cocoa nibs, the broken pieces of the roasted cocoa bean. Some manufacturers call this chocolate mass or cocoa mass. The FDA formally defines it as “the solid or semi-plastic food prepared by finely grinding cacao nibs. The fat content of the food may be adjusted by adding one or more of the optional ingredients specified in paragraph (b) (1)” (FDA 2019, Part 163, Subpart B, Section 163.111).

Cocoa liquor or mass naturally contains about 50 percent cocoa butter, although that is often adjusted by pressing out much of it. It can be returned to the chocolate in the manufacturing process or sold for cosmetics. As the mass by nature has no sugar, it may be the most rigorous definition of dark chocolate. FDA synonyms for this chocolate liquor in 2019 included unsweetened chocolate, bitter chocolate, baking chocolate, cooking chocolate, chocolate coating, or unsweetened chocolate coating (FDA 2019).

Some fine-chocolate manufacturers do sell unsweetened confectionary bars of chocolate as 99 or 100 percent cacao. They are quite bitter and for all but the true connoisseur an acquired taste. Baking chocolate is normally not conched (see **Conch, Conching**), as it is intended for baking, not snacking (Gordon 2007). While the FDA does not define dark, it does define “sweet chocolate.” It must have at least 35 percent chocolate liquor by weight and contain sugar. FDA synonyms include semisweet, semisweet coating, bittersweet, or bittersweet coating (FDA 2019).

EU chocolate regulations also do not expressly define dark or plain chocolate. They do, however, define chocolate: it must contain at least 35 percent cocoa solids, including at least 18 percent cocoa butter (EU 2000). Couverture chocolate spreads more easily, as it includes a higher content of cocoa butter. It is favored by chocolatiers and pastry chefs. EU standards require 31 percent cocoa butter in couverture; the FDA does not specifically define couverture.

The definition of dark chocolate, then, is left to the manufacturers. Perhaps most well known in the United States is Hershey's Special Dark bar. As this taste

may be familiar to consumers not accustomed to dark chocolate it can serve as a reference. It contains 45 percent cocoa mass (cocoa solids and cocoa butter) (Giller 2017). Most fine-chocolate and health-chocolate fans consider quality dark chocolate to begin at about 60–70 percent cocoa mass. Manufacturers feature bars that reach all the way up to 100 percent, although most popular is the lower range products, commonly 60 percent. “Intense” dark chocolate generally refers to a bar containing 75 percent cocoa mass or more. Generally, the higher the percentage of cocoa mass, the more bitter and astringent the taste. A high percentage of cocoa mass alone, however, does not indicate quality. Milk chocolate tends to have a reputation as inferior, but some fine-chocolate manufacturers produce an excellent product with a cocoa mass in the range of up to about 40 percent. This is quite a bit higher than the FDA requirement of at least 10 percent. It apparently does not, however, feature the possible health benefits of dark chocolate (Fine Chocolate Industry Association 2020; Witmer 2020; Giller 2017; Presilla 2009).

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Debauve & Gallais (France)

The fortunes of famous chocolatiers continue to rise and fall, as they have for centuries. In France, Chocolat Menier’s extensive nineteenth-century poster campaign featuring a small girl with pigtails writing *Éviter les contrefaçons* (avoid counterfeits) became among the century’s most iconic chocolate advertising. The posters designed by painter Firmin Bouisset are still sold today in reproduction. Émile Menier introduced France to its first solid chocolate bar in the late 1840s

and saw sales of the convenient confection soar. By 1889, Menier had grown to the point that at the world's fair it could display an Arc de Triomphe fashioned from 250,000 bars of chocolate in its trademark yellow wrappers, boasting that the arch represented just one day's production (Grivetti and Shapiro 2009; Cadbury 2010). But its fortunes fell and its brand finally was acquired by larger firms. Today Menier chocolate is still available from Nestlé, now owner of the brand, though uncommonly found in shops.

French chocolatier Debaue & Gallais of Paris, however, has survived for more than two hundred years, the oldest major French chocolatier still doing business. It never became famous for its mass appeal. It survived by emphasizing a high-end product originally purveyed to kings and emperors. Sulpice Debaue, like many early chocolatiers (including Jean-Antoine Brutus Menier) began as a pharmacist. Debaue in 1778 rose to the position of physician to the king (Debaue & Gallais n.d.). Chocolate for much of its history was considered to be a health food and, for pharmacists, a way to hide bad-tasting medicines. Debaue gained Crown favor in 1779 by producing a chocolate-disguised headache treatment for Queen Marie-Antoinette. The queen nicknamed the coin-shaped confection/treatment “les pistoles,” slang for coins. Legend indicated the original coin-shaped chocolate comprised cocoa butter mixed with sugar and, presumably, a headache remedy (Bolfold Digital Magazine n.d.; Debaue & Gallais n.d.). The queen's approval advanced Debaue to official chocolatier of Louis XVI (Debaue & Gallais n.d.; ChocoParis n.d.).

Debaue survived the anti-royalist regimes of the French Revolution to bounce back as chocolatier to royalty—in this case the ersatz royalty being Napoleon Bonaparte, in 1800. (Almond Crunch, a Debaue confection of almonds and chocolate, was supposedly his favorite.) The chocolatier's association with French royalty continued with the Restoration, as he was named official chocolatier to Charles X and, in the Orleanist monarchy of 1830–1848, Louis Philippe (Debaue & Gallais n.d.; *Le Gastronom*, May 2, 1830).

The firm continued to preserve its reputation as a chocolate maker to the serious connoisseurs of the affluent classes after Debaue took on a partner in 1800, his nephew Jean-Baptiste Auguste Gallais. They opened their first retail store that year in rue Saint-Dominique. In 1817, they moved to 30 rue des Saints-Pères, where the ornate shop stands today (Société 2020; Debaue & Gallais n.d.). Debaue & Gallais's reputation for fine chocolate grew with the 1825 publication of Jean Anthelme Brillat-Savarin's *La Physiologie du gout* (*The Physiology of Taste*). The influence of Brillat-Savarin to French and worldwide cuisine in society can scarcely be overestimated: he established the principles of gastronomy and, in particular, food in French culture. He is remembered today for the famous adage, “Tell me what you eat, and I will tell you who you are.”

Brillat-Savarin celebrated the attractions of chocolate in some detail. “Chocolate, prepared with care, is a food as healthy as it is agreeable,” he wrote, indicating a list of benefits from facilitating digestion to having “good effects on chronic illnesses” (Brillat-Savarin [1825] 1848, 92). He warned that those who complained about chocolate probably were using a product “of bad quality or badly made.” This may have served as a basis for Menier's advertising emphasizing its quality

as Europe in general moved toward increased interest in regulating food purity. But Debauve & Gallais became the bigger beneficiary of Brillat-Savarin's influential guide. Noting that after trying most products of Paris chocolatiers, Brillat-Savarin concluded Debauve's was superior, the product of a "very distinguished pharmacist" (Brillat-Savarin [1825] 1848, 95; Brillat-Savarin's masterpiece is still in print.)

Gallais followed Brillat-Savarin's gastronomic guide two years later with his own 214-page cocoa guide, *Monographie du cacao; ou, manuel de l'amateur de chocolat* (1827; *Cacao Monograph; or, a Manual for the Lover of Chocolate*). The book aimed to be comprehensive, covering description, history, culture, production, pests, preparation, manufacturing, and properties, including engravings (Gallais 1827). In 1830, the Paris publication *Le Gastronom*e hailed the book in an article (possibly underwritten by Debauve & Gallais) as the "vade mecum" for chocolate fans. "Now the most modest clerk has something in common with the richest banker in the daily usage of the unctuous ambrosia, nutritious, fortifying and hygienic" (*Le Gastronom*e, December 30, 1830, 2). Gallais's book is still available in reprint (Amazon.com) and online (Google Books).

Debauve died in 1836, and Gallais two years later. Descendants kept the firm under family control, however, with descendant Paulette Poussin as president as of 2020 (Société 2020; Debauve & Gallais n.d.). Worldwide, according to the company, its chocolate is sold at boutiques in Dubai, Taipei, Seoul, Tokyo, and New York.

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Desserts

Chocolate from its beginnings in Mesoamerica was considered to be a balm for health and sustenance. It was not considered to be a dessert or snack, either in the New World of the early 1500s or a century later when it began to make its way into European culture.

At least, it was not supposed to be. From the beginning, however, it was clear that native peoples found more than practical sustenance or healing from chocolate. They also delighted in its attractions as an enjoyable indulgence. The Aztecs found chocolate to be a luxurious drink, guiltily so in an austere culture (Frydenborg 2015). Maya mixed it with ground corn as a food but also, according to Bernardino de Sahagún's observations made in the mid-1500s, served it with flower spices and honey as an attractively frothy beverage (Norton 2006).

The first clearly documented introduction to Spain, in 1544, indicated chocolate was a gift of indulgence from the Maya to the Spanish court (Coe and Coe 1996). The beginnings of chocolate in the Old World, however, were mostly accompanied by explanatory and exploratory medical treatises to examine its effect on health and to categorize it as part of the Galenic medical system. It was not at first considered to be a dessert, at least not according to published accounts of the period.

We can surmise, however, that chocolate's attraction quickly grew beyond its introduction as a drink for good health; it also became a drink for good times. By the mid-1600s, observers such as the cleric Thomas Gage could write that everyone in the West Indies was enjoying the frothy, sweetened chocolate beverage, "unctuous warm, with moist parts mingled with the earthy" (Kashanipour 2016). English physician Henry Stubbe writing in 1662 extolled chocolate's health and nutritive qualities, emphasizing it was more than a pleasant luxury. So, by then, it must have been thought of in that way, helping to explain why it exploded in popularity as a new feature in European chocolate houses and coffee houses (Stubbe 1662).

By the end of the 1600s, chocolate already had become an ingredient in desserts. The first recipes taking chocolate beyond its consumption as a drink date from 1680 (Coe and Coe 1996). By 1700, recipe books appeared containing chocolate cake and chocolate cream (Grivetti and Shapiro 2009). A recipe for "curdled ice chocolate" using snow and salt appeared in Italy in 1694. Ice cream recipes appeared in English cookbooks by about 1750 (Loveman 2013).

By 1700, Europe's well-to-do commonly enjoyed chocolate desserts. Early French newspapers contained repeat reports of chocolate served as parties, balls, receptions, and other events, and given as gifts (*Mercure Galant*, September 1686, January 1692, October 1699, February 1700, etc.). While that newspaper continued to tout chocolate for health benefits, its inclusion in November 1711 of eighteen pages of recipes suggest that Paris had motives beyond health to indulge. In England, a 1723 culinary dictionary included recipes for chocolate biscuits, milk chocolate, wine chocolate, chocolate cream, and chocolate tart (Nott 1723).

By the 1800s, chocolate was widely presumed to be a dessert and snack, although its health benefits continued to be emphasized through much of the century. The famous chocolate mousse was indicated in a supper menu published in 1830; it presumably had become common at least a century before that (*Le Gastronomer*, May 13, 1830; Jones n.d.).

By the twentieth century, chocolate had lost any pretense as a health food. It was a treat or dessert, period. Some nutritionists actually counseled that the

now-ubiquitous milk chocolate was not healthy at all, based on its high sugar content. It could lead to obesity, tooth decay, acne, or just an unhealthy life style (Lippi 2015). Chocolate became a “guilty pleasure,” with recipes under titles such as “Better Than Sex Chocolate Cake” and other “decadent” chocolate recipes.

By the 1990s, new research questioned those presumptions. In fact, not only was chocolate wrongly blamed for endangering health; its antioxidants could make it positively healthy (McShea, Leissle, and Smith 2009). However, chocolate’s dominance in desserts offering “sinful indulgence” by 2021 did not seem to have diminished with research showing possible health effects. Chocolate-based dessert recipes do not usually make claims to be healthy. A few exceptions in 2021 included Stevia-based desserts replacing the high-calorie sugar and fruit dipped in unsweetened cocoa.

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Direct trade chocolate

See Fair Trade chocolate

Dogs, and Chocolate

What may be among the most attractive of chocolate’s qualities for humans is also the most toxic for dogs. Chocolate contains two stimulants, theobromine and caffeine. The caffeine is present only in tiny quantities (5–10 mg in an oz., 28 g), but the theobromine (150 mg in an oz. of semisweet chips) acts like caffeine.

The cocoa bean naturally contains quite a bit, 2–3 percent. As an alkaloid, theobromine is in the same class of plant-based substances that include morphine, cocaine, and nicotine. But only a few are toxic to humans, and the affect some people feel from theobromine, a faster heart beat and higher awareness, has contributed in the past to chocolate's reputation as an aphrodisiac (Drahl 2017; Balentic et al. 2018; Bloom 1998; FDA 2017).

Both theobromine and caffeine are safe for human consumption, but toxic to dogs and cats. In small amounts, they may not cause symptoms, but of dogs that consume from 114 to 228 milligrams per pound of their weight, half will die (FDA 2017). A toxic dose can begin with as little as 20 milligrams per kilo of weight (one kg is 2.2 lb.). Signs of poisoning include agitation, hyperactivity, drooling, vomiting, and diarrhea. At doses more than 40 milligrams per kilo, cardiac symptoms such as hypertension and arrhythmias; at more than 50 milligrams per kilo, one may see muscle tremors, twitching, seizures; and at 200 milligrams per kilo, or 100 milligrams per pound, death (Merck Veterinary Manual 2020). Chocolate shell mulch also contains theobromine and so should not be used when dogs are likely to be present.

Symptoms of chocolate poisoning in dogs will appear from six to twelve hours after eating. But not all chocolate is at the same toxicity, and not all dogs are at the same risk. Most toxic is cocoa powder; then, in order of toxicity, unsweetened chocolate, semisweet chocolate, dark chocolate, and, least toxic, milk chocolate (AKC 2019). Theobromine content in chocolate can range from 390 milligrams per ounce (28 g) in unsweetened “baking” chocolate to 44 milligrams per ounce in milk chocolate (FDA 2017). An average bar of chocolate (such as a Hershey Bar) is about 1.5 ounces.

Because dangers of ingesting chocolate differ by dog weight and product, online toxicity calculators are available from Merck or PetMD (<https://www.merckvetmanual.com>; <https://www.petmd.com/dog/chocolate-toxicity>). As an example, for a small dog (20 lb. or 9 kg) one ounce of milk chocolate would pose little danger. But one ounce of baking chocolate would require an emergency veterinary visit as symptoms will be moderate to severe (PetMD 2020). Veterinarians will induce vomiting if treated within two hours of eating, or if later, give activated charcoal to remove toxins, among other treatments (AKC 2019).

What about cats? Chocolate is no less toxic to felines, but pet owners know cats are unlikely to eat chocolate, unlike dogs. However, owners thinking they are giving cats a treat may encourage them to eat chocolate-based foods. As with dogs, most dangerous is dark and unsweetened chocolate, and symptoms are similar (Fetch by WebMD 2020).

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Dominicans (Religious Order)

Religious orders from strongly Catholic Spain became part of the New World chocolate culture soon after the Aztec conquest by Cortés in 1521. Jesuits, in particular, grew wealthy from the chocolate trade, but Dominicans also provided early descriptions and introductions of chocolate to Europe. Members of the order, established in 1216 by Spaniard St. Dominic, traveled to the New World as missionaries. To persuade natives to convert, they adopted some of their cultural practices, including chocolate consumption (Korten 2017). Cocoa production could also offer a way toward profit, however, so Jesuits primarily but also Dominicans moved to set up cacao operations in the New World. Most famous were cloisters of Dominican nuns operating in Chiapas, Mexico, and skilled in making chocolate, according to Dominican Thomas Gage, whose observations on chocolate in 1648 helped to introduce it to Britain (Kashanipour 2016; Gage [1648] 1677). Gage told the famous story of a Chiapas bishop possibly being poisoned with chocolate for opposing its use by church-going women. Gage said he and the Dominican nuns had tried to intervene in the row, to no avail (Gage [1648] 1677).

By this time, Dominicans had long been involved in New World chocolate operations. Members of this order reportedly first introduced cocoa to the Spanish court, gifts of the Kekchi Maya nobles who the order had transported back to Spain in 1544 to meet Prince Philip (Dillinger et al. 2000; Coe and Coe 1996). The Dominican order opposed the Jesuit order in its opinion regarding chocolate breaking the required fast before Catholic Mass. Dominicans said it did. Jesuits said it did not. The debate was not settled until a century and a half later (it did not, as it was ruled a beverage) (Forrest and Najjaj 2007). Dominican friar Bartolomé de las Casas introduced New World foods in his writings by trying to categorize the new by comparing them to something familiar to Europeans. Regarding cocoa, he wrote that the beans resembled almonds (Forrest and Najjaj 2007). As a reformer, Las Casas became concerned regarding Spanish rulers who appropriated native land and abused, sometimes enslaved, native people. His reform efforts brought new laws against the worst abuses of the *encomienda* (forced labor) system, but he could not stop the dramatic native depopulation from disease and abuse (Frydenborg 2015).

A network of Dominican monasteries, along with those of other Catholic orders, reached throughout Europe. Chocolate introduced through the missionary orders became a common gift among monasteries, and a common remedy as early

physicians considered native claims of chocolate's health-giving qualities. The pope himself enjoyed chocolate gifted by monks, a long ecclesiastic tradition. Historians suspect the monastery network played a key early role in spreading the popularity of chocolate to the Old World (Korten 2017).

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Dufour, Philippe Sylvestre

Chocolate's popularity in Europe soared following publication of Antonio Colmenero de Ledesma's *Chocolate; or, an Indian Drinke* in 1631 (see **Colmenero, Antonio de Ledesma**). The Spanish physician was far from the first to write about this new food for the Old World, but his work was first to be noticed generally. Chocolate's fortunes grew as it began to see favor beyond Spain, but few Europeans generally would have been familiar with it in the first third of the 1600s. We have little evidence of chocolate use beyond clergy and possibly court before Colmenero's book. But within a few years of that date, we can find solid evidence that chocolate had reached the streets of major European cities. In Oxford, we have a report that chocolate was prepared as early as 1648. Chocolate houses soon opened in London and Amsterdam (Grivetti and Shapiro 2009). England had seen the first translation of Colmenero's text in 1640. Three years later, René Moreau, leader of the Paris faculty of medicine and relative of Colmenero, produced the first French translation. It was subsequently translated into nearly all European languages including Latin (Jones 2013; Bibliothèque Nationale de France n.d.).

The obvious popularity of Colmenero's seminal work served as a springboard to most other early books on chocolate. Major works either partly or wholly borrowed from Colmenero, who was considered the authority. English authors

Thomas Gage in 1648 and Henry Stubbe in 1662 referred to Colmenero's work. In France, Philippe Sylvestre Dufour in 1671 produced his treatise arguing that the three beverages new to Europe (tea, coffee, and chocolate) should be considered together as medicines having a strong connection (Jones 2013). As all contain stimulants, Dufour's point made sense, and a few years later Nicholas de Blégny also took up the three in one book. Dufour, a Huguenot (Calvinist Protestant) merchant, banker, and pharmacist from Lyon, wrote in the introduction that he presented the work as a compilation of treatises on the subject "so that our nation, always curious about novelties, can understand in depth from these authorities and doctors regarding modern usage among us." He argued people commonly used the three every day "with success" to preserve health (Dufour 1671, n.p.; Huguenots n.d.; De Blégny 1687). Dufour did not claim to be a physician but relied on authorities he described as doctors or experts who had traveled to the origin countries and written of their observations. He noted the section on chocolate was entirely reprinted from Colmenero, "a Spanish doctor," and translated into French by René Moreau, "famous doctor from the Paris faculty of medicine" (Dufour 1671, n.p.).

Dufour's compendium did not, therefore, offer any new information about chocolate, as it did about coffee and tea. Moreau's translation of Colmenero had already been available for more than a quarter century. Nevertheless, Dufour's compilation became so popular on the Continent that a second edition appearing in 1684 was featured in the *Mercure Galant* of Paris. The newspaper's publisher noted in the October edition that he did not ordinarily report on new book editions, but "in the interest of our health it obliges me to tell you about one," referring to Dufour's edition (*Mercure Galant*, October 1684, 313–314). By this time, however, Dufour had fled France for Vevey, Switzerland. Religious intolerance in France had been growing. It culminated in a 1685 edict of Louis XIV expelling Protestants. Some earlier studies credited Jacob Spon, a Huguenot physician of Lyon and friend of Dufour, with the second edition's writing, contending Dufour was a pen name. But this presumption is apparently not supported by evidence (Bibliothèque Nationale de France n.d.; Jones 2013). However, both Protestants took refuge in Vevey, Switzerland, where they died, Spon in 1685 and Dufour in 1688. A peculiar coincidence is that nearly two centuries after Dufour's death, Daniel Peter invented milk chocolate—in Vevey.

Toward the end of the century, writers on chocolate began to break away from Colmenero's domination of the genre. Most well known was the work of Nicolas De Blégny, who in 1687 published *Le Bon Usage du thé, du caffè et du chocolat pour la préservation & pour la guérison des maladies* (The proper usage of tea, coffee, and chocolate to preserve health and to cure diseases). De Blégny, however, was from a far different background and enjoyed much better luck than Dufour. Despite modest medical training, he rose to become doctor to King Louis XIV. Among his written works, including the world's first medical journal, was his defense of the three stimulating beverages (Nicholls 1934). De Blégny in his introduction acknowledged Dufour's work of "about 15 years ago," probably not aware of its republication at the time he wrote. While he noted Dufour's work appeared "rather complete, it seemed to me nevertheless that this

matter was not yet exhausted.” He explained that he hoped he would include “a more complete history” based on his communication with scientists (De Blégny 1687, n.p.).

Unlike Dufour and earlier British writers, de Blégny did not simply republish Colmenero in large part or its entirety. His historical material included discovery and early preparation of chocolate and his explanation of how the word “chocolate” was coined. He said in native language, “chocolate signifies the sound, and *atte* or *atle*, water, as when one prepares the liquor one agitates with wood instrument in a manner that makes the sound, and so that is the etymology of the name chocolate” (De Blégny 1687, 193). This is probably the origin of a legend that has persisted into the twenty-first century, although recent scholarship has cast doubts on its authenticity (Coe and Coe 1996).

De Blégny, like English physician Stubbe, discussed chocolate in relation to Galenic medicine but also like Stubbe did not seem to care much about that debate. “As I cannot make any useful application of this doctrine and because I nevertheless have resolved to consider my subject in depth,” he concluded, “I find myself constrained to disregard readings of these authors and to make certain for myself the good and bad qualities of chocolate by a physical and serious examination” (De Blégny 1687, 197–198).

De Blégny’s next 108 pages considered chocolate in a wide variety of contexts, from its harvesting and preparation to its flavorings and presentation. By the end of the seventeenth century, chocolate had already become so fashionable that containers both elegant and ordinary had been invented to serve it. De Blégny presented both coffee pots (*cafetières*) and chocolate pots (*chocolatières*), observing that the sole difference was a hole in the cover of the chocolate pot for the handle of the *molinet*, the wooden frothing stick. Basic chocolate as a beverage, he wrote, should be boiled fifteen minutes with sugar before serving.

Scholars who have considered De Blégny’s work observed it was veering away from a mainly medical approach of the early writers to reflect a European lifestyle in which chocolate was beginning to play a stylish role. In his description of accessories, it appeared De Blégny, who also invented his own portable coffee maker, made his book “more about marketing” than about health (Jones 2013).

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Dutch Process

See Alkali, Alkaline Salts

F

Fair Trade Chocolate

It sometimes comes as a surprise to chocolate lovers to learn the sordid history of the world cocoa industry across the centuries and the globe. Much of it reflects the worst abuses of slavery, forced labor, and colonialism in an industry that grew to provide rich countries with a cheap treat at the expense of poverty and exploitation in poor countries providing the raw product. A colonial system that extracts raw cacao shipped for processing elsewhere has not changed much since its inception in the 1500s. Ivory Coast and Ghana, in particular, continue to suffer from a centuries-old system, despite those two countries producing between 60 and 70 percent of the world's cocoa. Nana Akufo-Addo, president of Ghana in 2020, said his country was locked in a colonial-style relationship with manufacturers: "Chocolate is a \$100 billion industry, and we who produce 65% of the raw material make less than \$6 billion from the sweat and toil of our farmers" (Pilling 2019).

Fair trade initiatives beginning in the 1990s set out to change that. The organization that today has become most familiar, Fairtrade International, grew from the Max Havelaar Foundation established in 1992 by several Swiss aid organizations. Its aim was "to promote fair and environmentally friendly trade with producers and workers in disadvantaged regions of the south" (Fairtrade 2010). The initiative began with Fairtrade-labeled coffee in 1992. The Fairtrade Labelling Organization International was founded in 1997 to develop standards and to inspect and certify operations for its Fairtrade designation. Other fair trade organizations have also promoted fair trade initiatives (Fairtrade 2010).

The push from the manufacturers themselves toward a better deal for cacao growers apparently began in 1991, when husband/wife team Craig Sams and Jo Fairley in London established a new chocolate label. It launched its appeal on high-quality chocolate based on sustainable and ethical sourcing. Green & Black's chocolate rode a growing interest in ethical initiatives for the cocoa sector to become Britain's fastest growing confectionary brand by the early twenty-first century. In 2005, it was acquired by chocolate giant Cadbury, which, in 2010, was itself acquired by an even larger entity, Kraft Foods, now known as Mondelez International (Green & Black's n.d.; BBC News 2005).

Fairtrade International, with its now familiar blue and green logo, expanded to offer a promised standard of certification for a variety of foods, including chocolate. In 2020, twenty-four chocolate labels carried the Fairtrade certification, including familiar bars such as Endangered Species, KIND, Kirkland (Costco brand), Lidl (grocery store chain), Tony's Chocolonely, Trader Joe's, and Valrhona (Fairtrade America n.d.). Fairtrade in 2020 indicated that its certification program had reached 322,000 smallholder farmers. Its economic standards required

minimum pricing and premiums, traceability of product, and transparency in trade. Its social standards did not allow exploitive child labor or working conditions. Its environmental standards aimed to minimize producer impact on the planet and ban the use of pesticides or GMO seeds, to protect national resources, and to encourage organic farming (Fairtrade America n.d.).

The agency has not operated without criticism. A craft chocolate movement that also began in the 1990s included small manufacturers who were not satisfied with the bureaucracy of Fairtrade, contending its paperwork and fees did not benefit farmers as strongly as they could. Producer organizations, normally farmer cooperatives, paid an annual certification fee to cover compliance auditing. Critics noted this only added to the farmers' costs and instead should be passed on to the consumers. In return, Fairtrade guaranteed farmers a minimum or premium based on the world market prices of cocoa, but critics said it was set too low (Leissle 2018).

Some of these critics opted for what they called direct trade: instead of farmer co-ops these manufacturers bought directly from farmers, visited the farms themselves, and paid more than Fairtrade price (Giller 2017). Taza Chocolate, a Massachusetts firm established in 2005 by Alex Whitmore, was one of the first small so-called "bean-to-bar" operators to commit to direct trade. It and other direct trade manufacturers promised to pay individual farmers more than Fairtrade's guaranteed minimum. Taza emphasized that not only did it pay "significantly higher" prices but also it provided a yearly "transparency report" to document its efforts to support farmers (Taza Chocolate 2020). Another well-known direct trade operator, Askinosie Chocolate of Missouri, reported that it paid a price above Fairtrade market prices and argued it supported socially sound practices, including organic farming and sustainability (Askinosie 2020). Dandelion Chocolate of San Francisco also in 2020 was a familiar player in efforts outside of Fairtrade to reach directly to farmers (Dandelion Chocolate n.d.).

A relatively small direct-trade manufacturer that by 2020 had arguably seen the biggest growth internationally was Tony's Chocolonely from the Netherlands. It was established in 2005 by an investigative reporter, Teun van de Keuken, who wrote that he was shocked at what he called "slavery" in the chocolate-producing countries of West Africa (Tony's Chocolonely n.d.). Failing to rouse the government or large cocoa multinationals to react, he explained that he decided to establish a chocolate operation built on his own ethical principles. Tony's Chocolonely differed somewhat from the direct trade approach of some U.S. operators in that the company negotiated with farmers' cooperatives in addition to directly dealing with individual farmers. As well, unlike many craft chocolatiers, it sourced from Ghana and Ivory Coast, the two countries that both dominate world chocolate production and world poverty of cacao farmers. Tony's Chocolonely reported in 2019 that in Ghana it paid about 29 percent above the "farm gate price," the actual amount given to cacao farmers, and 39 percent in Ivory Coast; this amounted to \$460 per metric ton in Ghana and \$520 per metric ton in Ivory Coast, including the \$200 Fairtrade premium (Tony's Chocolonely n.d.). Tony's chocolate has expanded operations to a number of countries in Europe as well as the United

States, where in 2020 its sales doubled from \$6.8 million to \$12.6 million (Myers 2020b).

But these are small players compared to the large multinationals that provide most of the chocolate that people consume worldwide. While they have received repeated criticism for failing to act on abuses of the cocoa sector, in 2021 many of the largest operators had pledged millions of dollars to reduce poverty, improve lives of growers, and reach sustainability at a lower risk of global environmental damage. Some of the largest multinationals have launched their own sustainability operations in response to their declared frustration over efforts that they say have failed, such as Fairtrade, Rainforest Alliance/UTZ, and other groups. A report from Voice Network, describing itself as a global network of NGOs and Trade Unions to promote sustainability in the cocoa sector, concurred in its 2018 Cocoa Barometer that none of the smaller initiatives had been able to ensure a sufficient income for farmers, reduce child labor, or stop environmental degradation (Voice Network n.d.).

Large manufacturers admitted more than altruistic reasons for their frustration at continuing sustainability issues in the cocoa sector. Nicko Debenham, head of sustainability for Barry Callebaut, the world's largest supplier of wholesale chocolate products based in Zurich, said what he called piecemeal certification programs such as Fairtrade were not sufficient (Confectionary Production 2018). But he warned that if effective action was not taken, the cocoa supply chain could dry up, as destitute, mostly West African farmers looked for stability beyond cacao farming. Debenham said Barry Callebaut had tried to encourage bigger farms, more diversification, fewer farmers, and better production techniques, but it was met with resistance and government bans on foreign firms (Pilling 2019).

Mars Wrigley Confectionary, the world's largest retail chocolate manufacturer (ICCO 2021), in 2018 declared, "The cocoa supply chain is broken, and current interventions are not enough to fix it." To respond, Mars launched its Cocoa for Generations project. It pledged \$1 billion over ten years to increase farmer income, protect children, preserve forests, and ensure a sustainable and responsible supply chain. Its work is primarily in Ghana and Ivory Coast but also has operations in Central and South America and Indonesia (Mars 2020).

Cadbury raised eyebrows in 2016 when as a Mondeléz brand it pulled out of the Fairtrade program and announced that Green & Black's was no longer going to be fully organic (Rodionova 2016). Instead, Mondeléz began to replace the Fairtrade logo on its chocolate products with its own Cocoa Life label. Its Zurich-based cocoa program promised to invest \$400 million in sustainability initiatives (Myers 2020a; Mondeléz International 2020). Cocoa Life director Cathy Pieters said if large multinationals did not make progress at addressing child labor, poverty, and deforestation in the cocoa sector that EU and U.S. regulators would consider legislation to force change. She noted, however, that the big multinational players did support legislation that would close loopholes and "level the playing field" to make sustainability programs more worthwhile (Myers 2020a).

In 2020, Nestlé dropped its own industry bombshell, announcing it would end its agreement with Fairtrade to supply cocoa, at a loss of almost \$2.5 million in

Fairtrade premiums to cooperatives in Fiji, Malawi, and Ivory Coast. While Fairtrade Foundation CEO Michael Gidney asked Nestlé to reconsider, noting that ending the agreement would roll back progress made to help 27,000 small-scale farmers, Nestlé explained it would work with Rainforest Alliance/UTZ because its mission more closely aligned with Nestlé's own sustainability plan, called Nestlé Cocoa Plan. In 2020, Fairtrade paid farmers' cooperatives \$240 a ton beyond market price (Myers 2020a). Nestlé, headquartered in Switzerland, in 2020 was the world's sixth largest manufacturer of chocolates (ICCO 2021).

Frustration over the slow progress of fair trade efforts from players large and small, however, could be reflected in a 2020 report from the U.S. Labor Bureau of International Labor Affairs. It indicated that 1.48 million children were still employed on hazardous labor related to cocoa. Some optimism could be found, however, because child labor had not increased despite growth in cocoa production, and forced labor of children and adults had become "extremely rare in the cocoa sector" (National Opinion Research Center 2020; World Cocoa Foundation 2020).

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Fat Bloom on Chocolate

Chocolate in bar form is finicky. It does not like moisture. It does not like heat. It does not like abrupt temperature changes. Unlike its consumers, it does not like oxygen. We need to prepare and store it mindfully or it may bloom. And unlike plants, that is not a good thing for chocolate.

Bloom is a gray or white dusting on the surface of a bar. It usually can be blamed on the customer, and not the manufacturer, but not always. Fat bloom is the result of cocoa butter's crystals aligning in unappealing patterns that affect appearance and texture. The development of a tempering process in Switzerland toward the end of the 1800s helped to minimize fat bloom and so leave the bars more attractive both in appearance and mouth feel (Coe and Coe 1996). The principle behind tempering relies on the unusual crystal makeup of the fat in chocolate, called cocoa butter. Cocoa butter hardens at room temperature. In that, it is unusual; most vegetable-based fats are liquid at this temperature. Chocolate's peculiar quality of staying solid until just below normal body temperature gives it that melt-in-your-mouth luxury that has contributed to the enormous world popularity of chocolate bars. But its stability and appearance also rely on unusual qualities of cocoa butter.

Tempering enhances the appealing qualities of a bar through a controlled heating process that melts the chocolate within specific temperature ranges (see **Tempering**). Of the six crystals in cocoa butter, only one, called Form V, aligns at the correct temperature to produce a pleasing and stable product (Gordon 2007; Kenji López-Alt 2019). All well-made chocolate has been tempered, though some not so well-made products show a mottled dull texture and flabby snap that betray a carelessly produced product.

Most chocolatiers know better than to sell a product like that. But correct tempering can be lost after the chocolate leaves the manufacturer. The culprit is usually improper storage. If chocolate crystal structure is set through controlled temperature stages, it also is lost through uncontrolled temperature fluctuations. That happens mostly when chocolate gets too warm, then is cooled. The fat rises to the surface in a powdery white, and the pleasant snap and sheen are lost.

Chocolate stored at about 56°–64°F (14°–18°C) should last a couple years. Some manufacturers add other fats or emulsifiers to increase shelf life and retard brittleness, although chocolate does not improve with age (De Pelsmaecker et al. 2019; Beckett 2000). But chocolate that has lost its temper in storage will produce a fat

bloom to tell us. It is still edible but not attractive. Fat bloom can be cured, however, by retempering. It is possible to do that on a kitchen stove (see **Tempering**).

Chocolate may prefer a cool place for longevity but does not respond well to refrigeration. The danger is not fat bloom. It is worse: sugar bloom.

Chocolate contains no water, and as pastry chefs know does not react well to its addition. Bars stored in the refrigerator and then quickly warmed are likely to encourage moisture condensation. The moisture again brings up the whitish powder, but this time it is not from fat. It is from the sweetener crystalizing on the surface, called sugar bloom. Sugar bloom appears slightly different from fat bloom, a hard white surface film showing crystals of sugar (Cargill n.d.; Gordon 2007). Again, it is edible but with a flaccid, grainy texture and unpleasant flavor. Exposure to air and light also contribute to chocolate's demise. Unlike fat bloom, sugar bloom has no cure (Sharp 2006).

Fat and sugar bloom do not always rise from improper storage or handling. Chocolate-covered substances, particularly nuts, can lend their fat and moisture to a chocolate coating, particularly if it is thin (Beckett 2000). The chocolates may spoil or take on the unattractive appearance and texture we call bloom.

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Ferrero Rocher (Italy)

The purveyor of chocolate hazelnut confections, notably Nutella and Ferrero Rocher pralines, began as a small pastry shop in Alba, Italy, near Turin. It was a latecomer as chocolate giants go. In 1942, Pietro Ferrero established his shop for high-quality chocolates. The signature product was based on a local sweet called *giandujot*, a wrapped paste block of chocolate and hazelnuts that had been regionally popular for more than a century. It could be sliced and eaten with bread. It grew to become Ferrero's hazelnut spread, in 1964 renamed Nutella (Butler 2015; Padovani 2015). The company reached out further after 1956 with factories in Germany and France, eventually expanding the brand throughout Europe (Ferrero Rocher 2019). Pietro's brother briefly took over the operation after his death,



Ferrero Rocher's hazelnut praline wrapped in gold foil is a relative newcomer to the stable of famous chocolate products. It appeared in Europe in 1982, and was not introduced in the United States until 1988. By 2021 Ferrero Rocher had grown to become one of the world's top five largest chocolate manufacturers. (Oduvaldo Mazza Junior/Dreamstime.com)

running the Alba plant with his widow. Michele Ferrero, Pietro's son, experimented with candy bars based on the chocolate and hazelnut formula, in 1957 inventing Creamblock (Padovani 2015). He assumed leadership of the company shortly after his father's death.

But the company did not produce its well-known Rocher candies until 1982, long after most worldwide iconic snack chocolate products had come on the market. The hazelnut-chocolate ball wrapped in gold foil was a hit in Europe, and so in 1988 it was introduced in the United States (Ferrero Rocher 2019). By 2018, the confection had rose to become the world's best-selling chocolate; the Alba factory was rolling out twenty-four million of the distinctive gold-encased orbs a day (Carpenter 2018; Butler 2015).

Ferrero, while familiar as a worldwide producer of products for those who loved chocolate, hazelnuts, and mints (its TicTac candy was introduced in 1969), was not big enough to reach the exclusive "big candy" club, the world's top ten chocolate and confectionary manufacturers. Then, in 2015, Michele died. His son Giovanni had been running the company since the unexpected death of his brother Pietro in 1997. Michele opposed acquisitions as a way to grow the company. Giovanni had a different viewpoint and was now in charge (Padovani 2015; Kirsch 2018).

While the Alba factory still existed, corporate headquarters by 2020 were based in Luxembourg for its friendlier tax laws. Giovanni Ferrero explained in a 2018 interview that he believed his existing product lines could not compete with

big manufacturers such as Mars and Mondeléz. To grow he would have to acquire. In 2015, Ferrero acquired the long-familiar British confection maker Thornton's. Industry analysts had considered the venerable firm to be in decline, but for Ferrero that was just the beginning (Kirsch 2018; Ferrero 2021). In 2017, Ferrero acquired two also-venerable chocolate brands in the United States, Fannie May and Ferrara Candy Co. The latter produced its familiar chocolate enrobed products under the Brach's brand (Thompson 2017). In 2019, it acquired Kellogg's snack food brands, including Keebler and Famous Amos. But the acquisition that caught the chocolate world's attention happened a year before. In 2018, Ferrero acquired the U.S. candy brands of Swiss chocolate giant Nestlé. The cost was \$2.8 billion (Yu 2019; Terry 2018).

Ferrero's acquisition brought to its chocolate candy portfolio three storied American names now almost a century old: Nestlé's Crunch, Butterfinger, and Baby Ruth. Crunch was an original Nestlé invention, developed at its Fulton, New York, plant, and introduced in 1938. Butterfinger and Baby Ruth had been acquired by Nestlé in 1990. They were originally produced by Curtiss Candy Co. of Chicago, founded in 1916 by Otto Schnering. The company's advertising genius boosted Baby Ruth to becoming in 1928 the country's top selling candy bar (Moriarty 2019; Curtiss Candy Co. n.d.).

Baby Ruth by the time Ferrero acquired the brand had long been subject of one of the country's longest-running candy bar legends. Curtiss Candy introduced it in 1921. The country had become familiar five years before with a baseball player named George Herman "Babe" Ruth. By the early 1920s, Babe Ruth had become the most famous person in America. Babe Ruth. Baby Ruth candy bar. Coincidence? Absolutely, claimed Schnering. He said he did not name his candy bar after the baseball hero. He named it in honor of President Grover Cleveland's daughter Ruth, who was during her infancy nicknamed "Baby Ruth." The Curtiss company stuck to this story to the very end of its corporate life when, in 1964, Schnering's sons sold the firm to Standard Brands. On acquiring the brands six years later, Nestlé also acquired the legend and saw no reason for change. In 1995, Nestlé's U.S. public relations manager reiterated that the bar was named after Grover Cleveland's daughter, not the sports star (Van Buren 1995).

The Baby Ruth–U.S. president connection, however many decades it was maintained through three company iterations, tends to fall apart on historical scrutiny. The twenty-second president had left the White House in 1897; he had been dead more than a decade before the candy bar was introduced. Moreover, Ruth Cleveland had died of diphtheria at age twelve. She had been gone from public memory since 1904. Nevertheless, confectionary yarn-tellers repeatedly returned to Schnering's argument, sometimes with embroidery, such as a suggestion that little Ruth had visited the factory. It was established twelve years after her death (Curtiss Candy Co. n.d.).

The argument of the skeptics puts less strain on credibility. They said that the Curtiss company approached Babe Ruth in hopes he would lend his endorsement, as he had to many products. But Schnering thought Ruth's price was too high. So, he instead capitalized on the sports star's fame with a name that almost matched, and a story that might hold up should he be sued for co-opting the name of the

most famous man in the country. Probably later owners of the candy bar clung to the story in fear of retroactive lawsuits (Curtiss Candy Co. n.d.). In a postscript notable for its cheek, the Curtiss company in 1926 actually sued the George H. Ruth Candy Co. for copyright infringement. That is, it sued Babe Ruth for attempting to market his own Babe Ruth bar. Curtiss won (*George H. Ruth Candy Co. v. Curtiss Candy* 1931).

On acquiring the storied Nestlé's candy brands, Ferrero began by removing the "Nestlé" from "Nestlé's Crunch," renaming it simply "Crunch." It also worked to reformulate the bars in an attempt to make them a bit healthier. Despite their fame, analysts noted the Nestlé's products had been losing market share as consumers moved to what they perceived to be more healthy options (Kirsch 2018). Nestlé decided in the United States to shift its focus to non-confectionary products such as bottled water.

Ferrero's effort to move toward a healthier emphasis backfired when in 2012 in a false-advertising lawsuit it was required to pay \$3.1 million for calling Nutella "healthy" and "part of a balanced meal." A California woman who sued said the product was actually "the next best thing to a candy bar." Given class-action status, the suit ended by inviting any American who purchased Nutella in the years proceeding to claim about \$4 per jar. Ferrero denied wrongdoing but did change its advertising (Burnham 2012). It did not tarnish sales of Nutella. The company by 2018 sold 365,000 tons of Nutella a year, a spread made mostly of sugar, palm oil, hazelnuts, skimmed milk powder, and cocoa. Dietitians did not consider it much of a health food. But it certainly was popular.

The company in 2020 sold its products in 160 countries. In 2015, it purchased one-fourth of the world's hazelnut production (Butler 2015). Its acquisitions propelled Ferrero Rocher by 2020 to nearly the top of the heap, the world's second largest chocolate manufacturer after Mars Wrigley (ICCO 2021). In 2021, it owned thirty-one manufacturing plants around the globe.

Like many multinational chocolate concerns, Ferrero Rocher has declared its commitment to addressing sustainability in the cocoa sector. Its 2020 sustainability report described global initiatives to protect the environment, source sustainably, empower farmers, and help local communities. It has declared an intention to help break the poverty cycle of cacao smallholders in Ghana and Ivory Coast, and in 2021 participated in the UTZ-Rainforest Alliance and Fairtrade certification programs (Ferrero 2021).

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Festivals and Conferences

Chocolate is celebrated at festivals around the world, often featuring regional and artisan makers, pastry chefs, and a chocolate-loving public. Conferences examine the chocolate sector from the perspective of producers, grinders, shippers, and manufacturers.

The world's largest festival in 2021 had its beginnings in Paris, but is of fairly recent origin. The Salon du Chocolat dates from 1994. According to a 2016 interview, founders Sylvie Douce and François Jeantet created a trade show called Chocoland based on a love of chocolate, but few connections to the industry. The trade show debuted in 1995. A year later organizers decided to capitalize on the city's reputation for fashion by combining the two in one show. In 1998, the Salon du Chocolat chocolate-fashion show expanded to New York City, Tokyo in 2000, and then to other cities (Rojas 2016; ChocoClic 2014). In 2021, it billed itself as "the world's largest event dedicated to chocolate and cocoa." It has held 237 salons in seventeen countries (Salon Du Chocolat n.d.). The Paris event is in late October.

A rival claiming to be Europe's largest chocolate festival is also in October, Eurochocolate, created in Perugia, Italy, by Eugenio Guarducci, also in 1994. By 2019, it attracted about a half million chocolate chasers to the Umbrian city, the festival's attractions spread across Perugia's town center (Chocolate Festival n.d.; Bella Umbria n.d.; Eurochocolate n.d.).

In the United States, claim to North America's largest chocolate festival comes from both the East and West coasts. New York City's Chocolate Expo, "the largest chocolate event in the United States," based on the number of vendors, the number of attendees, and floor size, features mostly artisanal chocolatiers. It is promoted



Eurochocolate, launched in 1994, claims to be the world's largest chocolate festival. In October 2019 it attracted a half million visitors to chocolate-themed attractions spread throughout the Italian city of Perugia. (Elisa Bistocchi/Dreamstime.com)

by Baum Image Group (Chocolate Expo n.d.). In the west, the Northwest Chocolate Festival in Seattle calls itself “the largest gathering of artisan chocolate makers in the world.” It was created in 2008 by Brian Cisneros “to showcase craft chocolate makers and educate chocolate lovers from all walks of life.” Among its staff in 2021 was Sharon Terenzi, a well-known chocolate blogger, listed as social media director. It takes place at the end of October (The Northwest Chocolate Festival 2021). Not all festivals cater only to fine-chocolate producers and fans with a palate to match. Choctoberfest in Hershey, Pennsylvania, celebrates one of America's most ubiquitous, and one of the world's largest, purveyors of chocolate.

Conferences examining the international cocoa sector do not generally cater to a general public. The World Cocoa Conference, scheduled for 2022 in Bali, Indonesia, is, according to its organizational website, “the leading event for the global cocoa and chocolate sector.” The International Cocoa Organization (ICCO) along with Argus Media, London, organizes the event aimed at cocoa-producing nations, grinders, wholesalers, and large manufacturers. The ICCO dates from 1973. It was originally established to manage the International Cocoa Agreement at the first International Cocoa Conference in Geneva. Today it is headquartered in Abijan, Ivory Coast. Conference cosponsors and attendees represent some of the world's largest cocoa-sector multinationals, including Mars Wrigley, Mondeléz, Cargill, Olam, and Valrhona, as well as government representatives and NGOs (World Cocoa Conference 2022).

A second global conference for industry and professionals, the World Confectionary Conference, is sponsored by *Confectionary Production*, a trade

publication. It targets the retail and bakery side of chocolate, including “industry developments and challenges affecting international sweets, snacks and bakery markets around the globe.” The 2021 conference was scheduled for Brussels, Belgium.

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Flavonoids

Serious research regarding centuries-old claims to chocolate’s health benefits began fairly recently. Studies in the early 2000s took off after a classic 2009 examination considered the unusually low blood pressure of the Kuna Indians on the San Blas islands off Panama. Researchers observed that the Kuna drank more than five cups of cocoa a day, probably a world record amount. They also observed that cocoa contains a high level of flavonoids. Could flavonoids in chocolate lower risk of cardiovascular disease? The study concluded that such benefits may explain the Kuna’s health (Hollenberg, Fisher, and McCullough 2009; Wilson and Hurst 2012).

Flavonoids are a family of polyphenol compounds found in most plants, particularly fruit, vegetables, and cereals. They are thought to have a healthy effect as antioxidants. Polyphenols help to control damage from free radicals associated with oxidative stress and disease (Pandey and Rizvi 2009). Flavonoids, in particular, are thought to combat this cellular damage. These apparently beneficial substances can be found in black tea, red wine, apples, or other plant-based foods. But what caused research excitement was chocolate. The flavonoid content of pure cocoa mass, also called chocolate liquor (the ground cocoa nibs), per 100 grams reached 1,400 milligrams, compared to 22 per 100 grams of red wine, and 40 per black tea bag (Katz, Doughty, and Ali 2011).

Flavonoids comprise many subcategories, but flavanols, specifically epicatechin, catechin, and procyanidins, provide most of the antioxidant properties in cocoa (Katz, Doughty, and Ali 2011). Chocolate mass also is high in fat, the cocoa butter, but research showed that as stearic acid is a major component it does not raise cholesterol (Beckett 2000; Magee n.d.).

A subsequent volley of research following the Hollenberg study seemed to offer exciting results. Chocolate consumption was found to have a variety of cardiovascular benefits because it activated nitric oxide synthase to cause vasodilation. Benefits of this included lower blood pressure and reduced risk of heart attack and stroke. It also was found to lower the risk of diabetes, to improve cognitive function, to protect skin from effects of sun and aging, and even to prevent dental cavities (Hollenberg, Fisher, and McCullough 2009; Witmer 2020; McShea, Leissle, and Smith 2009; Schmitz 2010).

Many studies did observe that chocolate is calorie-dense and so causes weight gain in larger amounts. As well, high flavonoids contribute to chocolate's natural bitterness, although manufacturing processes can remove or mask that taste. Processed chocolate has little fiber, but the nibs do. They are generally available at health food stores or online for those who wish to add their possible health-giving properties to cereal or yogurt (Sandborn 2015). Part of the growing demand for chocolate worldwide has been attributed to optimistic research regarding its healthy supply of cocoa flavonoids (Businesswire 2020).

More recently, however, some of the optimism has been called into question. Part of the challenge stems from the wide variety of chocolate products containing a wide variety of flavonoid levels. The Kuna drank pure cocoa or chewed the beans. Most consumers take chocolate in the form of a manufactured bar. And much of it is milk chocolate, often containing only 10 to 15 percent cocoa. Measurable benefits from chocolate's flavonoids, recent research has concluded, may require a bar of at least 70 percent cocoa mass, and the processing of that bar may have a wide effect on its cocoa flavonoids. Consumers cannot be sure how much they are getting. It is unknown how much is needed to offer a benefit, but likely most average chocolate eaters are not actually doing much to lower their risk of disease (Witmer 2020; Dennett 2020; Calixto-Cotos, Chire-Fajardo, and Orihuela-Rivera 2018).

To have an effect, researchers suggest that humans need 600 milligrams of flavonoids a day. By the time cocoa beans are processed, they have lost quite a bit of their flavonoids; what many of us call dark chocolate (semisweet or bittersweet) by U.S. law must contain only 35 percent cocoa mass; this provides 170 milligrams of cocoa flavonoids per 100 grams, or 85 grams per 100 calories (Katz, Doughty, and Ali 2011). The conclusion researchers unfortunately made was that an antioxidant-conscious consumer would need 3.8 ounces (108 g) of dark chocolate (600 calories), 4.4 ounces of semisweet chips (592 calories), or a whopping two pounds of milk chocolate (4,680 calories) to reach the minimum goal for cocoa flavonoid benefit (Giller 2017). An average bar of 70 percent or higher dark chocolate such as Lindt or Ghirardelli commonly available in grocery stores is about 3.5 ounces, 100 grams.

Mars Wrigley, the world's largest chocolate manufacturer, no longer markets chocolate as a health food. Its research indicated cocoa flavonoids were low once the chocolate was processed. It is now marketing a separate product, CocoaVia, as a dietary supplement, and not a snack, to take advantage of cocoa's antioxidant benefits (Nieburg 2018). Its CocoaVia supplement in 2021, the company argued,

with its high content of cocoa flavonoids could offer a wide variety of health benefits (<http://cocoavia.com>).

A preponderance of studies by 2020 still indicated some health benefits of dark chocolate, at least 70 percent cocoa mass. As the research was still ongoing, many researchers concluded that modest amounts may be beneficial (Squicciarini and Swinnen 2016).

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Forastero

See Criollo

Franciscans (Religious Order)

For the first three centuries of its existence outside Mesoamerica, chocolate was closely associated with Roman Catholicism. This began with the Spanish conquest of Central America a few years after Columbus. By the early 1500s, Spain's and Portugal's governments aggressively strengthened their commitment to Catholicism by turning to forced conversions and oppression of non-Catholics both in their colonies and in Europe. The Spanish and Portuguese inquisitions instigated by the Crown grew to cruel spectacles called *auto-da-fé*, a public punishment of anyone who refused to convert to Catholicism or who was suspected of not being committed strongly enough to the faith. Spectators reported watching these demonstrations of religious extremism while eating chocolate, and chocolate also became a part of the prisoners' experiences. Extensive Inquisition records show the accused offered it as a gift, bribe, barter, or commodity (Prinz 2017; Coe and Coe 1996). The long tentacles of Inquisition brutality extended to New Spain, but Catholic religious orders operated there separately from this secular arm of religious power. Missionary contributions to both the knowledge and spread of chocolate were usually more benign, although evidence indicates the orders, particularly the Jesuits, did sometimes rely on forced labor and Black slaves on cacao plantations (see **Jesuits**).

In particular, the Franciscan order approved of cocoa consumption, spread its usage, and enhanced our knowledge today of pre-Columbian chocolate customs in Mesoamerica. (This region comprises central Mexico and the modern countries of Belize, Guatemala, El Salvador, Honduras, Nicaragua, and north Costa Rica that were central to cacao cultivation and chocolate consumption.) Franciscan friars, in particular, jumped quickly across the Atlantic, arriving five years after the conquest in May 1524. Their work and that of other orders bore fruit; by the late 1520s, many of the Indigenous population had been baptized. But influence did not flow only one way. The friars themselves picked up native ideas, perhaps to win converts, including one particularly important native custom: drinking chocolate (Grivetti and Shapiro 2009; Korten 2017). Some members of religious orders sought to document customs of pre-Columbian society. The friar who wrote the most important work of early Indigenous ethnography was Franciscan.

Bernardino de Sahagún sailed to Mexico in 1529. He spent the next sixty years in the New World. Based on extensive interviews, Sahagún in 1577 produced an enormous work of twelve volumes, including 2,468 illustrations. His *General History of the Things of New Spain* comprised extensive descriptions of chocolate customs, including observations on its preparation, sale, and consumption rituals. His research methodology resembled modern anthropological fieldwork, but his purpose was religious: he believed that to convert natives to Christianity he first had to understand their own customs and "false gods." Sahagún reflected his time in his sense of superiority and abhorrence of some native customs, but not all. He wrote at the beginning of the first volume that Mexicans "are held to be barbarians and of very little worth; in truth, however, in matters of culture and refinement, they are a step ahead of other nations that presume to be quite politic" (Sahagún 2016, n.p.). The book is often called the Florentine Codex because it ended up in

the Medici library, now the Medicea Laurenziana Library in Florence. It was unknown to scholars until rediscovered in the 1700s.

Sahagún's work included extensive descriptions of Mexican chocolate prescriptions for medical conditions. It listed at least one hundred maladies for which according to Indigenous custom the cure was cocoa. Among health benefits were chocolate's purported aphrodisiac properties. These benefits continued to be ascribed to chocolate over the next more than four centuries, although even by the 1600s careful observers discounted that effect. Sahagún also described native preparations that included honey, evidence that sweetened chocolate did not originate with the Spanish (Dillinger et al. 2000; Lippi 2015; Presilla 2009; Coe and Coe 1996).

Some early beginnings of chocolate beyond Mesoamerica also can be credited to Franciscan missionaries. Franciscan Father Junípero Serra introduced chocolate to missions in California by the mid-1700s. Documents of Franciscan friars who established a string of twenty-one missions from Baja California to San Francisco often mentioned chocolate. One list of provisions for California Franciscans dated 1769 included chocolate, sugar, cinnamon, and chili, ingredients for the Mexican-style chocolate drink (Grivetti and Shapiro 2009; Prinz 2017; Miller 2013).

Historical research generally does not show evidence of chocolate introduction to the Far East before modern times, but documents do indicate that in 1678 Franciscan missionary Buenaventura Ibañez working in China requested a shipment of cacao from New Spain to Canton as a gift to the "king" of that city. Chocolate subsequently became a regular part of shipments to Franciscans working in China, usually indicated as a pharmaceutical. It may have come from the Philippines, as in 1670 missionaries introduced cacao cultivation in that Spanish colony (Grivetti and Shapiro 2009). Little evidence, however, can be found indicating chocolate use in China during this period ever spread much beyond the missions themselves.

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Fry Chocolate (UK)

Of the Quaker-owned businesses that dominated manufacture of nineteenth-century British chocolate, the oldest was J. S. Fry & Sons. In its earlier years, it was also the most innovative. Fry's invention of the chocolate bar in 1847 revolutionized chocolate consumption. Finally, the industry could offer a chocolate for eating, not only drinking, and moldable into any shape. Fry also employed the first steam-powered chocolate grinder in 1795 and became chocolate purveyor to the Royal Navy in 1824. Its most successful product, Fry's Chocolate Cream bar, was introduced in 1866 and still was manufactured in 2021. By 1878, Fry had become the world's largest chocolate manufacturer, accounting for one-fourth of chocolate and cocoa sold in Britain (Squicciarini and Swinnen 2016; Wagner 1987; Coe and Coe 1996; Grivetti and Shapiro 2009). But Fry was also one of the first to succumb to consolidation, joining rival Cadbury in 1919.

Fry's chocolate began in Bristol under a different proprietor. As chocolate use became widespread by the eighteenth century, Walter Churchman, an apothecary (pharmacist) as were many early chocolate purveyors, realized that the port city could become a convenient point to supply cocoa for commerce. Bristol's commercial ties to the American colonies offered a possible market, and so in 1728 Churchman began producing chocolate. A company tradition of innovation began early, as the next year Churchman was granted a patent to cover a machine that he had devised to help automate the laborious chocolate-grinding process. The patent letter described it as a "new invention or engine for the expeditious, fine and clean making of chocolate" (Curtis 2013, n.p.). In 1731, a Bristol newspaper advertisement called it a "new invention of making chocolate without fire, to greater perfection in all respects." The product was "free of grit and gross particles so much disliked." Churchman called his product "superfine chocolate" (Grivetti and Shapiro 2009; Wagner 1987, 13; Squicciarini and Swinnen 2016).

Pharmacist Joseph Fry, also in Bristol, launched competition when he began to advertise his own brand of chocolate. Research has uncovered a local advertisement for Fry chocolate dating as early as 1735 (Wagner 1987), although other sources indicate Fry did not open his pharmacy until 1753 and did not begin selling cocoa until 1756 or 1759 (Quakers n.d.; Prinz 2017). Research has also left some confusion regarding from whom Fry acquired Churchman's operation. It is documented that Fry bought Churchman's patent in 1761, but this was more than three decades after Walter opened his shop. Recent research based on advertisements, however, indicated that Walter died in 1741, and Charles, sometimes identified as his son, was actually his brother. It was he who carried on the operation until its sale to Fry (comment by Victoria Wisteroff 2020, in Curtis 2013).

Two things are clear: Fry's operation predated other chocolate manufacturing firms by at least three decades and so can be considered the world's first chocolate manufacturer (Lombard in France was established in 1766; von Lippe in Germany, 1765; and James Baker in the American colonies, 1765) (Wagner 1987). Second, the company's efforts from the beginning to improve the manufacturing process earned it credit as the first chocolate manufacturer to industrialize with its Watt steam-engine-powered operation in 1795 (Oddy and Miller 1976). Fry's son, Joseph Storrs Fry, who set up the Watt engine, also was granted a patent for a new cocoa-bean roasting machine. In 1822, J. S. Fry made his three sons partners. In 1824, J. S. Fry & Sons used 40 percent of all cocoa imported to Britain (Quakers n.d.). Fry persuaded the British military to send its drinking chocolate with troops during the Crimean War (1853–1856) and moved aggressively into Canada (Cadbury 2010).

But its greatest gift to the chocolate world, the holy grail of chocolate makers, was a patent the company obtained in 1847 to produce a bar of chocolate. The process used cocoa powder squeezed from the cocoa mass by a steam-powered press (Beckett 2000). Combined with sugar, some of the cocoa butter was then returned to the powder, yielding a smooth product that could be poured into molds. This improved the gritty, brittle chocolate bar that was impossible to mold and unattractive to eat (Squicciarini and Swinnen 2016). Fry introduced its bar at an 1849 Birmingham, UK, exposition, the first true eating chocolate. The original product, called *Chocolat Delicieux à Manger*, was attractive for its portability as industrial Britain's train network matched its growing urban workforce. But it was not so *delicieux* at the beginning, somewhat bitter, coarse, and heavy. Fry continued to experiment by making a minty cream dipped in chocolate. The bar took off. Fry rose to become the world's largest chocolate manufacturer (Coe and Coe 1996; Cadbury 2010).

The firm's mercurial success would be tarnished by the food adulteration scandal of 1851–1854. In 1851, *The Lancet*, a British medical journal, began a series of articles by physician Arthur Hill Hassall evaluating foreign substances common in retail chocolate products. He considered a wide variety of what he called adulterants, examining nearly every chocolate product sold in Britain. Some of what he found was disgusting (mutton suet) or even toxic (red lead pigment). Hassall reported most chocolate contained some adulterant. In the case of Fry and Cadbury, Britain's two cocoa giants, Hassall found the “foreign matter” to be starches. Fry's Granulated Cocoa, for example, contained potato flour, arrowroot, or other starches (Hassall 1855).

Fry and rival Cadbury had launched some of the nineteenth century's most famous advertising campaigns, and in response to the adulteration report their campaigns diverged. Cadbury decided to jump on what the company presumably considered to be a future in which legislation and consumer preferences would demand a “pure” product. It undertook an ad campaign designed to persuade consumers that Cadbury had mended its ways and now offered “pure cocoa,” emphasizing the purity of its featured product called Cocoa Essence (Grivetti and Shapiro 2009; Macedo 2016). Conversely, Fry argued that the addition of food products such as starches was not an adulteration and did not cheapen quality or threaten

health. Some Britons preferred the thick beverage of chocolate and arrowroot starch that Fry sold as Pearl Cocoa (Grivetti and Shapiro 2009; Quakers n.d.). Cadbury's advertising featuring charming children to symbolize purity gained an upper hand, however, and J. S. Fry began a thirty-year slide in its competition with Cadbury. Fry's owner Joseph Storrs Fry II refused to modernize and could not compete with the intense competition of Swiss milk chocolate. Cadbury and Fry merged in 1919, although Fry products continued to be sold (Cadbury 2010).

Cadbury and Fry, despite being business rivals, were associated on an ideological level, as both were Quakers. Their religion was of some significance to their industrial operations. Both, along with third competitor Rowntree, committed to running a business under strict ethical principles that they believed were dictated by their religious values. Fry along with the others committed the business to addressing the welfare of employees. This industrial philanthropy included improving working conditions, education, recreation, pensions, and even housing. Some of their innovations have become standard in Britain and the United States (Wagner 1987; Fitzgerald 1999). As well, the companies' ethical standards considered sourcing of cocoa, long reputed to be harvested by slaves or forced laborers. Fry and Rowntree supported William Cadbury's decision in 1904 to investigate claims of slavery and forced labor among the cacao plantations of São Tomé and Príncipe, Portuguese island colonies off West Africa. In response to clear evidence of abuse, in 1909 Fry joined Rowntree and Cadbury in a boycott of cocoa from those islands that during this period had become the largest supplier of the world's cocoa (Higgs 2012; John 2002).

After the merger, the Fry operation was moved to a site near Keynsham just out of Bristol toward Bath. Its factory, called Somerdale, featured the Quaker values that supported welfare of its employees. It came to dominate the city, at its high point employing workers numbering in the thousands. However, in 2007 Cadbury announced its intention to close Somerdale and in a cost-cutting effort move production to Poland.

Kraft Foods (now the Mondeléz International food conglomerate), in what British mass media at the time called a "hostile takeover," gained control of Cadbury in 2010. It pledged to keep Somerdale open, but soon reconsidered, arguing that Cadbury had already committed extensive resources toward a move to Poland (Kelly 2011). The factory was closed in 2011, after 283 years, effectively ending a legacy of the world's oldest chocolate manufacturer. In 2021, the company remained only as boxes of documents in archives. But the world's oldest candy bar, Fry's Chocolate Cream, lived on.

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G

Gage, Thomas

In Britain, the earliest introduction to chocolate practices came by way of translations from the Spanish, in particular, the work of Colmenero de Ledesma. Despite their prowess as a maritime power and a growing colonial empire, Britain had little knowledge of cocoa even decades after it had been established in Spain. In 1648, Thomas Gage in London published *A New Survey of the West-Indies; or, the English American His Travel by Sea and Land: Containing a Journal of Three Thousand and Three Hundred Miles Within the Main Land of America*. The book came to Europe quite late, as cocoa customs go, and Gage admitted that. He observed that chocolate was “being this day used not only over the West India’s, but also in Spain, Italy and Flanders, with approbation of many learned doctors of physic” (Gage [1648] 1677, 238). But the British had first rejected it, he said. “How then might this cacao with the other Indian ingredients be had in England?” First, he explained, the British have to see value in cocoa. “I have heard Spaniards say that when we have taken a . . . ship laden with cacao, in anger and wrath we have hurled overboard this good commodity” (Gage [1648] 1677, 247).

This account of British navy ships throwing away cocoa beans as “sheep’s dung” has become one of several chocolate legends to whom we credit Gage. As a young Dominican friar who grew up Catholic in Britain, Gage decided in 1625 to seek his fortune in the New World, arriving in Veracruz. Gage observed that chocolate as a beverage was so commonplace that almost everyone in Mexico and Guatemala were consuming it throughout the day, frothy and sweetened (Kashanipour 2016). In chapter 16, Gage begins his examination of chocolate with an explanation of the word itself: “The name Chocolate is an Indian name, and is compounded from Atte, as some say, or as others, Atle; which in Mexican language signifies Water, and from the sound which the water (wherein is put the Chocolate) makes as Choco, Choco, Choco, when it is stirred in a cup with an instrument called a Molinet, or Molinillo, until it bubbles and rises unto a froth” (Gage [1648] 1677, 238).

Gage spent twelve years in the New World before returning to England. His observations of chocolate rituals there have become some of the earliest eyewitness accounts written in English; his descriptions for centuries have been taken as fact. However, recent research has questioned Gage’s account of the name chocolate. Coe and Coe (1996) observed that while *ate* does mean water in Nahuatl, the Aztec language, “choco, choco, choco” is fanciful, as the natives did not use the *molinillo*; it was a Spanish invention. As for his recounting of the Spanish stories of the British disdaining cocoa beans, the two countries fought as rivals in the



As a Dominican friar, Thomas Gage, in 1625, decided to seek adventure in the New World. On returning to London after 12 years in Mesoamerica, Gage, in 1648, published a book recounting his travels. It included observations of chocolate use that served to build popularity of the then-unfamiliar drink in England. (National Archives)

New World. It would seem far-fetched that as late as the early 1600s, when cocoa beans were known to much of the Old World, the sailors would mistake them as “sheep dung.” Why would Spanish ships value the “dung” so much that they would carry large shipments? In any case, by 1656, we have evidence that England found high value in the beans. A report from a French newspaper indicated after a battle at the port of Cartagena, the British seized a Spanish ship “with a charge of cocoa,” which they sent to “My Lord Protector” Oliver Cromwell in London “to make a beverage that they called Chocolate” (*La Gazette* 1656, 1343).

But Gage’s accounts are considered reliable regarding those experiences that he witnessed himself. During a stay in Chiapas, today known as San Cristóbal de las Casas, Gage witnessed what has become the well-known “Women of Chiapas” chocolate legend. The traditional center of cacao in pre-Columbian southern Mexico became, wrote Gage, home to

two Dominican convents. “Here are also two cloisters of nuns, which are talked of far and near, not for their religious practices, but for their skill in making two drinks which are used in these parts, the one called chocolate” (Gage [1648] 1677, 191).

Chocolate consumption there became so popular that women would drink it even during Mass at the cathedral. The bishop, Don Bernardino de Salazar, responded by forbidding the practice on threat of excommunication. The women responded by boycotting the cathedral and attending Mass in the presumably less strict convents and monasteries. Gage wrote that his attempt to mediate failed. The impasse ended, Gage said, when the bishop was (possibly) murdered, succumbing (again, possibly) to poison slipped into his own chocolate. From Gage, we therefore learn the source of what he said had become a well-known aphorism, “Beware the chocolate of Chiapas” (Grivetti and Shapiro 2009; Forrest and Najaj 2007).

Gage himself seemed little concerned with danger of poison, as he wrote of his affection for Chiapas chocolate. “I used it twelve years constantly, drinking one cup in the morning, another yet before dinner between nine or ten of the clock, another within an hour or two after dinner, and another between four and five in the afternoon; and when I was purposed to sit up late to study, I would take another cup before eight at night which would keep me waking till about midnight.” Gage said this habit kept him healthy, “without any obstructions or oppilations” (Gage [1648] 1677, 246).

Gage borrowed Colmenero’s description of chocolate’s health benefits based on Galenic medicine of the time, to whom he gives credit (Gage [1648] 1677, 238). As for recipes, Gage also copied those of Colmenero. But Gage wrote that he thought “neither clove, nor Musk, nor any sweet water fit,” even though they were popular in the West Indies. He observed that maize was a common addition, and cinnamon, “one of the best ingredients and denied by none” for its diuretic quality that “helps the kidneys” (cinnamon, however, was not indigenous to Mesoamerica, and so must have been a Spanish addition) (Gage [1648] 1677, 242).

Gage noted that cinnamon and “long red pepper” (probably cayenne) were beaten with anise seed and cocoa, with added *achiote* (annatto) for color. This produced a cocoa “in the form of a paste, which will be almost liquid and made into tablets, or else without a spoon put into boxes” (Gage [1648] 1677, 244). He wrote that most commonly in Mexico it would be combined with hot water and frothed with a *molinet* but could also be mixed with cold water and frothed with added sugar (Gage [1648] 1677, 244–245).

The significance of Gage’s observation of chocolate as hardened and stored in boxes gives historians a hint regarding how the practice of cocoa use spread in Europe. The boxes, he wrote, were sent around Mexico but “much of it is yearly transported into Spain” (Gage [1648] 1677, 191). Gage went on to observe that boxes also reached Pope Urban VIII (Korten 2017). The extensive network of Europe’s monasteries is thought to have originated the spread of chocolate in Europe (Norton 2006).

Gage was not uniformly positive in his description of chocolate’s use. In addition to admitting it could cause corpulence, he described some unethical clergy who exploited an Indigenous tradition of ritual offerings to gods. Gage said one friar boasted that he had extracted local tribute during All Souls’ Day including chickens, eggs, bread, fruits, and cocoa (McNeil 2006).

Physician Henry Stubbe, who in 1662 published the first extensive discourse on chocolate’s health benefits written in English, used Gage as a source for the “Women of Chiapas” story. Jamaica had become a British colony in 1655; by 1670, cacao production had been established on the island, and the British upper class was fast joining the Continent in acquiring a taste for what Stubbe called the “Indian Nectar.” A second edition of Gage’s book appeared in 1677. Chocolate came first to London coffee houses. White’s Chocolate House opened in 1693, but the first chocolate advertised “at a Frenchman’s house” appeared in 1657 (Grivetti and Shapiro 2009).

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Galen

See Humoral Medicine

Ghana

Cacao at its origin did not grow wild outside of South America and so was unknown to Africa or the rest of the world. By 1900, however, the largest sources for cocoa beans comprised colonies of West Africa. Ghana after independence in 1957 emerged as the world's largest producer of cocoa beans. The top spot was taken by neighboring Ivory Coast in the late 1970s, but in 2021 Ghana still retained second place (Kolavalli and Vigneri 2010; Leissle 2018).

The eclipse of the Americas as the main source of the world's cocoa in favor of West Africa reflects not only the dynamics of European colonialism but also the cyclical nature of the cocoa sector in general. Portuguese explorers reached the area now known as Ghana in 1471. Attraction of a trade in gold between Europeans and African kingdoms led to the traders referring to the area as the Gold Coast, the gold coming from North Africa through old trade routes across the Sahara. Trade in the precious metal fell by the 1700s as the Ashanti kingdom that came to dominate the area cooperated with Europeans from many nations to grow a new and nefarious commodity for trade: slaves (Ghana n.d.; GhanaWeb 2020).

It is difficult to estimate the number of slaves from West Africa who made the perilous one-way crossing to the Americas, but probably it totaled about 4.5

million between 1701 and 1810. Of that, probably 545,000 were shipped from the Gold Coast alone, where most European nations had established rival trading fortresses to manage the operation. The majority of slaves went to South America to work on plantations. Cocoa, in particular, was a valuable commodity that for two centuries became closely related to African slave labor in Brazil and other countries and islands of the West Indies (Prinz 2017; Frydenborg 2015; Squicciarini and Swinnen 2016).

By the early nineteenth century, abolition movements and a fall in demand for slaves encouraged European nations to ban the trade. Britain, which had emerged as the dominant force in Gold Coast slave trade, outlawed the practice in 1807. As a growing colonial empire, it purchased the coast's colonial fortresses from Denmark and the Netherlands to become the *de facto* colonial ruler of that region. By 1901, the entire country had become a British Crown colony (Ghana n.d.).

As the slave trade through the Gold Coast waned, trade in a third commodity reflected the confection's burgeoning popularity in the late nineteenth century: cocoa. The Portuguese, in particular, had long before made a move to establish cacao plantations outside the New World. In 1824, the Portuguese Crown left a newly independent Brazil to set up cacao operations in São Tomé and Príncipe, islands off West Africa. These "Chocolate Islands" would grow to dominate world cocoa production by the beginning of the twentieth century, eclipsing the operations of the New World that had been the sole supplier of cocoa for nearly four centuries.

Now part of a British colony, farmers considered the possibility of moving cacao production to the mainland of Gold Coast. Who actually brought the first cacao to the Gold Coast, and when, is in dispute, but the country itself credits Tetteh Quarshie, a native planter who brought seeds from the island of Bioko (then known as Fernando Po) to the Gold Coast in 1876 (Taylor 2018). Unlike the Portuguese colonists in the Chocolate Islands, who established regimented plantations based on "contracts" that were in effect slavery, British entrepreneurs tried to save money by establishing smallholders under minimal supervision (Grivetti and Shapiro 2009). Minimal investment meant more profit for cocoa buyers, though the quality during the early period was considered inferior. As the population of milk chocolate by 1900 was soaring, however, manufacturers like Cadbury in Britain bought Gold Coast cocoa in presumption that the quality problems could be disguised by the addition of milk (Macedo 2016).

Accusations of forced labor and child labor among these cacao farmers continued to mark the country's rise to become the world's largest supplier. Boom-and-bust cycles characteristic to the cocoa sector continued throughout the century, as the country in 1957 became the first sub-Saharan nation to declare colonial independence. It changed its name to Ghana, recalling a famous ancient African empire. (The empire was in fact located to the north, in Mali.) But the economy's reliance on the vagaries of the cocoa sector repeatedly destabilized the government, encouraging several coups, beginning in 1965–1966, when a world cocoa price collapse coincided with Ghana's record production of 538,000 tons. The early 1980s saw the country's cocoa production fall to a low of 159,000 tons in 1982–1993, 17 percent of world volume, compared with 36 percent in

1964–1965 (Kolavalli and Vigneri 2010). Efforts to revive Ghanaian cocoa succeeded in bringing the country back to a 400,000-ton production in 1995–1996, with a doubled productivity per hectare, to 404 kilos. Growth has continued apace, while poverty among a population mostly reliant on the cocoa sector fell from 51.7 percent in 1990s to 28.5 percent in 2005–2006 (Kolavalli and Vigneri 2010). Production from 2010 to 2020 increased 62 percent, from 1,885,600 tons to 3,050,000 tons (Myers 2020).

Many Ghana farmers improved yield by relying on more robust cacao hybrids that required fertilizer and pesticides, attracting environmental concerns. As well, world concern over forced and child labor continue. A BBC report in 2000 found human traffickers working the cocoa farms in West Africa and widespread use of children toiling in “appalling conditions” (Lawrance and Roberts 2019). Large multinational confectionary companies promised to redouble efforts to halt child labor and bring more cacao farmers out of poverty by promising a minimum price for their crops. But progress has been slow despite an increase in Ghanaian cocoa farming households from 58 to 86 percent (Myers 2020). A long-awaited 2020 report of the University of Chicago’s National Opinion Research Center, sponsored by the U.S. Labor Department Bureau of International Labor Affairs, indicated that 55 percent of Ghanaian children in agricultural households worked in cocoa production. However, despite an increase in cocoa production between 2013 and 2019, child labor remained stable. School attendance increased from 89 to 96 percent (NORC 2020). The World Cocoa Foundation in 2020 reported that while too many children still worked in the cocoa sector, forced labor for both children and adults had become “extremely rare,” and hazardous child labor had been reduced by one-third (World Cocoa Foundation 2020). Children in 2021 did continue to toil in the cocoa sector, although it was part of a larger challenge of African child labor that included clearly worse exploitation as domestics and sex workers. Children working in the cocoa sector in many cases considered that they were bettering themselves by moving to comparatively richer settings. It was not always an evil lure as it sometimes was portrayed. However, hazardous child labor continued in the cocoa industry, as it did in many industries both in Africa and elsewhere in the world, and appeared difficult to eradicate without considering larger social challenges (Leissle 2018).

West African cocoa, as of 2021, provided 65 to 70 percent of the world’s production and set the flavor benchmark profile as “neutral.” The typical Amelonado cultivars are associated with a more pronounced bitterness and astringency (Afoakwa et al. 2008). Ghana’s neighbor Ivory Coast remained the world’s highest cocoa producer, but Ghana at number two produced a product that received a slightly better price, 3 to 5 percent higher. Shashidhara Kolavalli, an agricultural agronomist formerly with the World Bank working in Africa, and Marcella Vigneri, a development economist, indicated in a 2010 report that Ghana could obtain a higher price because its beans were a little higher in cocoa butter, a little lower in defects, and a little cleaner. To obtain the expected West African flavor, the beans were fermented in heaps under banana leaves for six days and then dried slowly in the sun to decrease acidity (Kolavalli and Vigneri 2010). Ghana, recently

more politically stable than Ivory Coast, differed from many other cocoa countries in that it had retained more government control over its cocoa producers. Oversight by its government cocoa marketing board, the COCOBOD, encouraged farmers to cultivate for consistent “Ghana style” flavor, a characteristic taste many in Europe and North America expect (Leissle 2018).

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Global Warming

See Climate Change

Godiva Chocolate (Belgium)

Belgian chocolate was a relative latecomer to the centuries-old industry (see **Callebaut Chocolate**). Most of its well-known names feature Belgian-style pralines, sometimes called Belgian truffles, a soft filling enrobed in chocolate invented by Belgian pharmacist Jean Neuhaus Jr. in 1912 (Neuhaus n.d.). Godiva's praline-style chocolates came along a little later but still early by Belgian chocolate industry standards. Pierre Draps Sr. began turning out his flavors enrobed in chocolate in 1926, setting up a store in Brussels (Godiva n.d.). Finding inspiration from the well-known English legend of Lady Godiva, he opened a shop for high-end chocolate later operated by his three sons. The brand perhaps featured the most alluring name in the business of mass-market chocolate, but the company explained that inspiration came from Lady Godiva's association with values of boldness, generosity, and pioneering spirit (Godiva n.d.).

The brand remained in Belgian hands until 1966, when it was acquired by the Campbell Soup Co., which introduced Godiva to U.S. consumers. Godiva opened a U.S. manufacturing plant two years later in Reading, Pennsylvania, that in 2021 still manufactured the product using Belgian recipes (Godiva Chocolatier n.d.; Greater Reading Chamber Alliance 2022).

Its *Truffe Originale*, dark chocolate mousse in dark chocolate rolled in cocoa powder, debuted in 1946 to become a familiar praline-style chocolate associated with Godiva. The chocolate maker expanded internationally in the early 1970s beginning with boutiques in New York, Paris, and Tokyo (Godiva n.d.).

Godiva continued to build an international market by expanding into hundreds of retail locations worldwide. By 2016, it operated about 650 boutiques under ownership of the Turkish food giant Yildiz Holding. Yildiz, owned by the Ülker family, in 2019 had a reach of more than 300 brands in 120 countries (Wunsch 2020; Cision PR Newswire 2019). It purchased Godiva from Campbell for \$850 million in 2007 after the U.S. company began to divest itself from noncore operations (Newhouse 2007). Yildiz also extended reach of Godiva to Japan, in 2018 the world's sixth largest chocolate market (Geller and Barbaglia 2018). While Godiva's website in 2021 did not disclose its Turkish ownership, it still manufactured its product in Belgium and in its Pennsylvania plant. Godiva in 2021 had become undoubtedly the world's most famous brand of Belgian chocolate. Other well-known brands from Belgium include Leonidas, Neuhaus, and Côte d'Or. The latter is now owned by Mondeléz, formerly Kraft Foods.

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Grinders

See Processors

H

Hernández, Francisco

Among those Europeans who sailed from Spain to the New World in the decades after conquest, most who took an interest in native customs and natural phenomena were members of Catholic religious orders. Francisco Hernández was an exception. One of the most important physicians and botanists of the 1500s, Hernández's interest was science-based and secular; he was a physician to Spanish king Philip II. A native of Toledo, he trained as a doctor at the University of Alcalá de Henares. He was appointed royal physician in 1570. King Philip II, keen to know more about the medicinal qualities of Mexican plants, asked Hernández to sail for the New World with these instructions: "Consult, wheresoever you go, all the doctors, medicine men, herbalists, Indians and other persons with knowledge of such matters" (Chabrán 2015; Edward Worth Library n.d.).

Hernández took the king's mandate further, describing three thousand plants then unknown to Europe, as well as natural history and culture. He added a few descriptions of animals and minerals, compiling six folio volumes in Latin, the scientific language of the era (Stanford University Press 2002). The extensive work profusely illustrated by native artists became one of the important scientific botanical references of the era. It was widely consulted and copied, and became a standard reference even into the 1800s. Of the well-known later writers on cocoa, English physician Henry Stubbe referred to Hernández for reference on Galenic classification of cocoa (see **Humoral Medicine**), writing "Hernández . . . holds it to be temperate, or inclining to cold and moisture" (Stubbe 1662, 43).

Hernández did not live to see his work published, but the manuscript remained at the library of the Escorial (king's residence) for consultation from its availability in 1576. Unfortunately, the original was destroyed in a 1671 library fire (Albala 2007; Stanford University Press 2002). Scholars had made copies of the important document, however, most significantly an edition published in Rome in 1651. An edition did not appear in English until fairly recently (Chabrán 2015).

Despite his directions to focus on health benefits of native plants, Hernández spent a fair amount of time considering cocoa as an important market crop and its beans as a common substitute for money in Mexico. He described four drinks made from what he called *cacahoaquáhuatl*, the name derived from *cacahuatl*, meaning cacao, and *quauiti*, meaning tree in Nahuatl language. Hernández wrote that the drink sometimes was consumed simply by adding water, but other times the ground beans included *Cymbopetalum penduliflorum* (earflower) and vanilla. Other additions might include honey, maize, and chili, but natives did not use milk or sugar (Bye and Linares 1990a; Chabrán 2015). He described pouring the drink from one vessel to another to raise foam or stirring with a wooden pestle. This may be the *molinillo* (frothing stick) still sometimes used to make cocoa in

Mexico. While Hernández described native customs, he worked a half century after the Spanish conquest. Pre-Columbian natives did not use a *molinillo* to froth or mix their cocoa.

Hernández as a physician of the time focused, in particular, on the healthy qualities of cocoa from the perspective of Galenic, or humoral medicine (see **Humoral Medicine**). For a millennium, this was the underpinning of European medical practice. Of qualities based on the four humors, he determined that cocoa was cold and moist. This is a paradox for the humoral theory, as usually the combinations were warm and moist or cold and dry. It is possible Hernández accepted the contradiction as the natives themselves considered cocoa to be “cold” (Albala 2007; Dillinger et al. 2000; Coe and Coe 1996). Native medicine did not know Galenic standards, of course, but Hernández writing a half century after the conquest described other oddities that would have been unknown before European colonization, notably the use of the *molinillo*. It is possible European ideas crept into this classification. Stubbe in 1662, nearly a century after Hernández, still cited the Spanish botanist. Cocoa “is multi alimenti, yields plenteous nourishment, saith Hernández, who holds it to be temperate, or inclining to cold and moisture” (Stubbe 1662, 43). While extolling cocoa’s extraordinary health benefits for liver problems, dysentery, fever, and other ailments, Hernández did admit cocoa could make the frequent user “extraordinarily fat.” This also could be a plus, however, if prescribed for thin, weak patients (Bye and Linares 1990b; Grivetti and Shapiro 2009).

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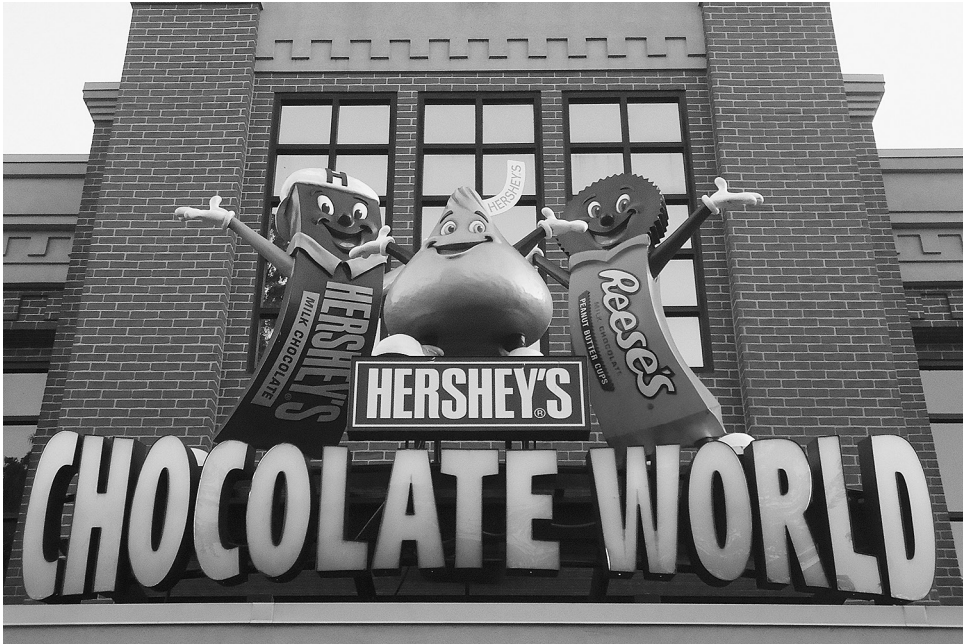
Hershey's Chocolate (USA)

Hershey's Chocolate Co. may not be the world's largest manufacturer (it is number five, according to the International Cocoa Organization), but its fame in America extends beyond its iconic Hershey Bar—for the good, the bad, and the sometimes ethically questionable. Milton Snavely Hershey began life in 1857 on a farm near Derry Church, Pennsylvania, raised Mennonite. The religion's roots related to the Quakers who at the time dominated British chocolate production and appear to have influenced Hershey's approach to its manufacture in Pennsylvania. After two false starts, Hershey's 1883 candy venture, Lancaster Caramel Co., found success to give Hershey the financial means to expand (Hershey Story n.d.). The extravagant chocolate exhibits featured as part of the 1893 Columbian Exposition in Chicago moved Hershey to consider something different. Instead of caramel, he would jump on two burgeoning trends of the late nineteenth century: mass production and milk chocolate.

He purchased the entire Columbian Exposition exhibit of chocolate-making equipment set up by Lehmann Company of Germany, including its roasting, winnowing, milling, mixing, and molding machines, and had it shipped to Lancaster (Grivetti and Shapiro 2009; Wagner 1987). He began in 1893 to produce dark chocolate. Hershey sold his caramel division, an “empire” in the American confectionary world, for \$1 million. He set out to build a new town, a paradise of industrial chocolate, to offer jobs, clean air, good schools, and idyllic prosperity (Brenner 1999). While the genesis of Hershey's utopian dreams is uncertain, his Mennonite background suggests that he was aware of British Quaker chocolate titans Cadbury and Fry, who had already launched towns based on similar ideals, reflecting a popular concept of paternal capitalism during this period.

But Hershey still faced a problem: his chocolate. His dark chocolate was somewhat bitter and gritty, as was common during this period. He believed his secret to success in the American market was milk. But he did not know how to make milk chocolate. The Swiss recipe developed in the 1870s was still proprietary, one of the most coveted secrets of the Gilded Age chocolate world. Walter Baker Chocolate Co., the oldest and then largest purveyor of cocoa in the United States, did not know either. Hershey hired two of its workers and set them to the task of developing a milk chocolate bar that he knew could be made but not how. Hershey's managed to make small batches, but did not know how to upscale to industrial production. A problem: chocolate with milk rapidly turned rancid. After years of experimentation, assistant John Schmalbach finally hit on a formula that included skim milk with heavy sugar, heated to condense, then added to cocoa powder and cocoa butter. It worked but did not quite match the Swiss taste. Hershey's liquid condensed milk fermented a little during manufacture to leave a slightly sour taste in the bar (Brenner 1999; Frydenborg 2015; the Swiss milk chocolate secret turned out to be condensed milk in powdered form).

Hershey's milk chocolate ended up with a strong sugar-forward flavor, slight sourness, and a somewhat grainy texture compared to the Swiss formula. But American palates came to prefer it, particularly as Hershey could mass-produce his bars for just five cents. It may have been light on chocolate flavor while heavy on (cheaper) sugar, but when launched in 1905, Hershey saw first-year sales of his



Hershey is not the world's largest chocolate manufacturer, but has established an almost legendary American legacy through its theme parks and hotels in large U.S. cities. Its Chocolate World can be visited at its headquarters in Hershey, Pennsylvania. (Joseph Skompski/Dreamstime.com)

five-cent Hershey Bar reach \$1 million. While Americans loved Hershey's product, sales flopped in Europe, whose chocolate lovers had become used to the British or Swiss styles. European makers have ridiculed Hershey for having no idea what he was doing and so trying to market an unpalatable mistake. The Hershey firm not surprisingly has denied this. It has not mattered to Americans who love Hershey's milk chocolate (Prinz 2017; Squicciarini and Swinnen 2016; Brenner 1999).

While Hershey's visit to Cadbury and Fry in England perhaps encouraged his interest in paternal capitalism that reflected Quaker values, Hershey himself as an adult did not retain the strong religious ties of the British chocolate leaders. But like Cadbury's Bournville, Hershey's "Chocolate Town" (Hershey, Pennsylvania) for his workers included houses, schools, parks, and public transportation (Hershey Story n.d.). In 1915, Hershey and his wife Catherine, unable to have children of their own, worked out a plan to establish a school for orphan boys. Catherine had been in poor health for some time and died that same year at age forty-two. It was reportedly a loss Hershey never overcame. In 1918, Hershey, then sixty-one, donated his entire fortune to the Milton Hershey School. In 2021, it had become the most richly endowed school in the United States and continued to operate as a private K–12 institution enrolling two thousand students (Brenner 1999; Hershey Story n.d.; Milton Hershey School n.d.).

In 1907, Hershey Company introduced a new shape for its milk chocolate that it called the Hershey's Kiss. It became the rage of American chocolate lovers, in

continuous production except during the years of World War II. In 2020, 780 million of the diminutive foil-wrapped confections smacked out of Hershey's conveyor belts every day. But it was from this familiar product that the question of Hershey business ethics surfaced.

The chocolate kiss had already been invented in 1894 by a chocolate manufacturer from Lititz, Pennsylvania, Wilbur Chocolate Company. It was sold as Wilbur Buds, suggesting the chocolate resembled flower buds. Wilbur Buds were originally wrapped separately, closely resembling Hershey's kisses, although its name was stamped on the bottom on what resembled flower pedals. Several manufacturers copied Wilbur Buds, including most famously Hershey, which had its plant only twenty miles away. Wilbur Chocolate sued all of the copycats. But Hershey prevailed and established an advertising campaign to separate its product from the competition. Wilbur Buds in 2021 were still available, although multinational Cargill acquired the company in 1992 and closed the Lititz factory in 2016 (Prinz 2017; Wilbur Chocolate 2019; Kawash 2010). Hershey also was sued in 1905 for copying Daniel Peter packaging and accused by Baker of corporate spying.

In 2005, seeing the potential growth of artisanal chocolate, Hershey acquired Scharffen Berger Chocolate. One of the pioneers of the craft chocolate movement, the company was credited with coining the term "bean to bar" and had become an iconic producer of fine chocolate based in San Francisco. On acquisition, Hershey promised to keep production in that city but in 2009 closed the factory and moved the operation to Illinois. The exclusive blends formerly featured by Scharffen Berger were no longer indicated on its 2020 website operated by Hershey (Martin 2015; Presilla 2009).

William F. R. Murrie, who joined Hershey's as a salesman, became president of the company in 1903. After Hershey donated his fortune and disengaged himself from day-to-day affairs, Murrie in effect ran the company, retiring in 1947. A 1950 *New York Times* obituary credited Murrie for Hershey's success, observing, "It was Mr. Murrie who originated and marketed the famous Hershey bar" (*New York Times* 1950, 18). In an unexpected twist, Murrie's son R. Bruce Murrie collaborated with Forrest Mars Sr., later scion of the world's largest chocolate company, to create a Mars confection introduced in 1940. It was named after his and Mars's initials: M&M's. But Hershey Company and Mars Inc. soon grew to be archrivals for the U.S. chocolate candy market (Brenner 1999).

Hershey has been criticized for buying cocoa produced using child labor and for underpaying farmers, but that accusation is in common with all the top multinational manufacturers (Whoriskey and Siegel 2019). Also in common with big chocolate makers, Hershey has established its own initiative in an effort to improve the lives of cocoa farmers, enhance sustainability, and reduce child labor. Its Cocoa for Good program launched in 2018 promised to invest \$500 million by 2030 into sustainability and poverty-reduction programs (Hershey 2019). Its research labs have examined ancient historical roots of cacao in Mesoamerica (Presilla 2009).

Hershey's expansion into theme parks and hotels helped to solidify its central role in American chocolate lore; in 2021, its Chocolate World attractions were

featured in New York City (Times Square), Las Vegas, Singapore, and Niagara Falls, Ontario, along with Hershey World in its Pennsylvania headquarters (Hershey's n.d.). Hershey's success in becoming a touchstone of U.S. chocolate culture can be traced not only to Milton Hershey's effort to produce a reasonable mass-produced product at an affordable price. Its familiarity was enhanced by Hershey's massive operation to produce rations for the military in World War II. According to Hershey archive documents, in 1937, U.S. Army quartermaster general Paul Logan asked the company to formulate an emergency soldiers' ration that was strong on nutrition but could survive high temperatures and rough soldier treatment. It also, explained Logan, ought to be less appealing than normal chocolate so that a soldier would not be tempted to snack on a ration reserved for emergency. Logan explained that the bar should taste "just a little better than a boiled potato" (Hershey Archives 2018). Hershey chemist Sam Hinkle produced a combination of chocolate liquor (also called chocolate mass), sugar, skim milk powder, cocoa butter, oat flour, and vanillin (synthetic vanilla). Americans were accustomed to strongly sweetened chocolate, so sugar was reduced to bring forward chocolate's natural bitterness. The concoction would not melt. The paste had to be pressed instead of poured into molds. But a four-ounce bar weighed in at 600 calories; later thiamine hydrochloride was added as a Vitamin B1 source to prevent beriberi. The "Logan Bar" was later officially designated "Field Ration D," carefully wrapped to protect it from poison gas (Hershey Archives 2018). It must be acknowledged that documents from Nestlé, then producing chocolate in its Fulton, New York, factory, dispute this account, indicating it played a role in the development of Field Ration D (see **Military Campaigns and Expeditions**).

About 24 million of the bars were being produced each week by the war's end. But Hershey's attempt to please Logan by making an unpalatable bar worked too well. It tasted so bad, soldiers reported, and upset the stomach so often, that they came to despise it. They nicknamed it "Hitler's Secret Weapon" (Lewis 2015; Mental Floss n.d.). In 1943, the U.S. military decided to give soldiers a break, asking Hershey to come up with something slightly more palatable. The result was Hershey's Tropical Chocolate Bar, tropical because it still did not melt as normal chocolate would. The bar stayed in production through decades after the war. Its most famous service came as part of the Apollo 15 moon landing in 1971. Truth was that the replacement reportedly did not taste that much better, though it was more nicely wrapped. Hershey's Tropical Chocolate Bar changed formula in 1957, became Hershey's Desert bar in 1990, and was discontinued in 1991 (Hershey Archives 2018).

In 2021, the most familiar Hershey's chocolate brands in addition to the original Hershey Bar and Kiss included Reese's Peanut Butter Cups, 5th Avenue, Heath, Mr. Goodbar, York Peppermint Patties, Almond Joy, Mounds, KitKat (a Nestlé brand except in the United States), and Cadbury Dairy Milk (a Mondeléz brand produced in the United States by Hershey). The story of how Hershey acquired the rights to Britain's famous Dairy Milk bar, along with Cadbury products Mounds, Almond Joy, and York Peppermint Patties, is worth a closer look. Hershey and its main competitor, Mars, together in 2016 dominated the U.S. chocolate market with a 74 percent share. Hershey's came first, with 44 percent, but the

country's best-selling chocolate product was M&M's, a Mars brand (Wunsch 2021).

Cadbury dominated chocolate sales in the United Kingdom and other countries worldwide. Cadbury sold its U.S. operation to Hershey's in 1988, hoping the \$300 million deal would help to build U.S. sales of Cadbury brands. Cadbury's itself was sold to U.S. food conglomerate Kraft in 2010, however, the resulting company was renamed Mondelez. Hershey responded to Cadbury's efforts to import its Dairy Milk bar and other chocolate products by suing in 2015, arguing at the time it had the rights to manufacture Cadbury products using different recipes (Hanbury 2018). Cadbury could no longer export its British-made Dairy Milk or other bars to the United States.

Some consumers argued, however, that the Hershey's version tasted much different from the English Dairy Milk. The ingredients list did read differently; the British version listed as its first ingredient milk, the U.S. version, sugar. Hershey's argued this simply reflected different labeling requirements. The European Union, after a long battle with UK confectioners, agreed to allow up to 5 percent cocoa butter equivalents (CBEs) such as palm oil or shea butter; the U.S. FDA allowed none in products labeled chocolate. Hershey's argued that its version of Dairy Milk adjusted only the amount of cocoa and cocoa butter. But saying "only" raised eyebrows of some chocolate specialists. An informal taste test in 2018 concluded that the UK version did seem creamier, and the U.S. version did seem more bitter, subtle but noticeable differences (Hanbury 2018).

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Humoral Medicine

Chocolate and other New World food discoveries grew to challenge medical knowledge in Europe that had not seen great change for fifteen centuries (also see **Colmenero, Antonio de Ledesma**). The humoral theory of medical treatment traced to the teaching of Hippocrates himself in ancient Greece four centuries before the beginning of the Christian era. His writings and those of his school established the principle that the gods were not responsible for human disease, and so the answer to its treatment was not prayer. Instead, disease stemmed from an imbalance in the four basic humors of the body, tied to the four elements that made up all matter, air, water, fire, and earth. The four bodily fluids arose from the four elements. Air corresponded to blood and was hot and wet. Phlegm corresponded to water, cold and wet. Yellow bile corresponded to fire, hot and dry. Black bile corresponded to earth, cold and dry. Illness or mood change meant a body either was deficient in, or in excess of, one or more humors. A cure could be effected by prescribing a dietary substance, or purging the body of a humor, to restore balance (Lagay 2002).

The theory of humors evolved into the Galenic medicine practiced in Europe and the Middle East from the 1300s through much of the nineteenth century. Galen (c. AD 130–210) rose to prominence in ancient Rome as a surgeon of the gladiators (Jackson 2001). Called from the ancient Greek city of Pergamos, Galen became physician to Roman emperor Marcus Aurelius, under whom he published a large number of works reflecting his medical knowledge (Galen 2015). Galen learned anatomy practically from his work tending to sometimes horrifying injuries he encountered from the contest ring. He emphasized an approach to treatment based on careful observation.

Galen's combination of the Hippocratic humors and careful observation of patients became a Western standard seldom questioned during the era of "library medicine"; that is, medical knowledge based on study instead of experimentation. The best Renaissance doctor was most thoroughly versed in Galenic theory.

Humoral physicians believed that exercise, climate, environment, and diet could upset a body's humoral balance to cause illness. The goal, then, would be to return the humors to balance. Every food or medicine known to Medieval Europe had long been catalogued for their humoral properties based mostly on flavor. Dairy products were cool and wet. Beans were dry. Meats and fats were hot and moist. Physicians diagnosed which humor was out of balance and prescribed treatment with a substance considered to be its opposite.

Chocolate was one of several New World substances that challenged a system long set in dogma based on foods known to the ancient Mediterranean world. Galen did not know about cocoa beans. The challenge to European physicians, then, was to classify new food discoveries into the old humoral system.

Some were easy to classify. Chocolate was not. It was presumed to be a medicine. It was treated as such by Indigenous Mexicans whose testimony formed the basis of Europe's earliest descriptions in the 1500s, the Badianus Manuscript and the works of Hernández, and Sahagún. Chocolate's use as a medical treatment endured for the next several centuries; it was still popularly sold by pharmacists in nineteenth-century France. But to humoral medicine, chocolate was a conundrum that probably served as one wedge ultimately discrediting the entire theory.

Chocolate's naturally bitter and astringent taste suggested it should be cold and dry. But the high fat content could nourish, suggesting hot and moist. To counteract a humoral imbalance, then, how should the New World food be prescribed? Despite a long list of health benefits ascribed to chocolate based on native medicine, the key question of its humoral classification eluded physicians through the 1500s and 1600s. The 1631 treatise by Spanish physician Antonio Colmenero de Ledesma became most authoritative and republished work on cocoa for more than a century; he said it could be both cold and dry for its astringency or hot and wet for its fat. He argued this was no inconsistency, as milk also straddled these classifications (Colmenero [1631] 1652). But it did not put an end to the paradox. While Spanish physicians continued to bicker, a British doctor, Henry Stubbe, took a look for himself. Following an observation that some physicians said the cocoa bean was cold and dry, but that cocoa butter was hot and wet, he concluded, "Fine, let men debate eternally the temperament of the nut. They, who have ascribed to it qualities altogether repugnant in nutriment, have never controverted its incredible nutritive faculty" (Stubbe 1662, 43). In his 1687 work, French physician Nicolas de Blégnny also seemed to have figuratively thrown up his hands at the entire humoral debate, concluding, "As I can make no useful application of this doctrine, and as I nevertheless had taken a resolution to go deeper into my subject, I am constrained to ignore the readings of these authors, and to ascertain for myself the good and bad qualities of chocolate by examination physical and serious" (De Blégnny 1687, 197–198).

That both Stubbe and de Blégnny suggested they would examine cocoa for themselves instead of referring to humoral classification reflected a notable shift away

from a thousand-year-old reliance on library medicine and toward one based on actual examination. That idea rose in the next century to dramatically reorient medical practice toward science-based medicine that today dominates the discipline. In 1672, English physician William Hughes contended that in fact chocolate was not a medicine and should not be treated as such. It was a health-giving drink. People drank it for pleasure. If chocolate refused to fall into an acceptable humoral classification, perhaps it was the system, and not the chocolate, that needed attention (Albala 2007).

Humoral medicine was disintegrating by the end of the 1700s, though physicians clung to its treatments as best medical practice even as its theories no longer seemed to make sense. George Washington died at sixty-seven in 1799 after physicians described the humoral technique of purging “excess blood”: Washington was drained of an alarming 80 ounces. Finally, Galen’s two-thousand-year reign in Western medicine came to an end when Robert Koch’s germ theory revolutionized treatment toward the end of the nineteenth century. Chocolate by 1900 was no longer considered a medicine but a treat, possibly healthy, but probably not.

Ancient humoral medicine is still with us. We see traces of the old ways in Western languages. An astringent-forward wine is called “dry.” Someone who is feeling peevish is said to be in an “ill humor.” If we are crabby or spiteful, we may be called “bilious,” full of bile. The sanguine mood refers to the warm humor of blood. Calm and detached? We have become phlegmatic. And while we may ridicule humoral medicine today for its apparently ridiculously misguided view of medical treatment, it did emphasize an approach that required doctors to carefully observe a patient’s malady, considering every human as an individual requiring treatment based not on presumptions of evil spirits to be excised but on practical responses to address human ailments.

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Inquisition, Spanish

See Spanish Inquisition

Ivory Coast (Côte d'Ivoire)

Adjacent nations of Ghana and Ivory Coast have shared a history more tortured than triumphant for the nearly five centuries since Europeans first set foot on the coast of West Africa. The legacy continues: the two together supply about two-thirds of the world's cocoa beans and share the poverty, child labor, and ecological damage of its production. Of the two, Ivory Coast is the biggest brother in cacao: its production in 2020 was by far the world's highest. That year it produced 2.18 million tons of cocoa beans, about half of world production; in second place was its neighbor Ghana, with about 20 percent (Statista 2021; Pearce 2019). "It means everything!" said N'Zi Kanga Rémi, governor of a rural department north of Abidjan, the capital, in 2019. Speaking to a British reporter, he continued, "Our houses are built with cocoa! The government runs on cocoa! All our policy focuses on sustaining cocoa!" (Adams 2019).

Unfortunately, of the estimated six million Ivoirians working in the cocoa industry, many are desperately poor, with no access to running water or electricity (Adams 2019; Lawrance and Roberts 2019). But it was not always that way. It used to be worse.

The first European visitors to the area were Portuguese explorers in the mid-1400s. Cacao was unknown, but evidence showed Portuguese explorers soon began another trade that came to define West Africa for three centuries: slaves. The transatlantic European slave trade centered in West African countries grew in the 1600s and 1700s to involve all European powers. They created a transatlantic system among Africa, Europe, and the Americas to bring slaves for plantations throughout the New World. Prosperity based on slave labor grew from plantations raising tobacco and cotton in the north to sugar and cocoa in the south, particularly Brazil. Cocoa in the Western Hemisphere grew based on slaves' labor from the Eastern Hemisphere. But there was no cacao in West Africa itself.

There were elephants, however. Ivory Coast takes its name from its most famous indigenous animal. The elephant is featured on the country's coat of arms. Trade in African ivory grew during European colonization to become probably the third most important commodity after slaves and gold. Ivory Coast features the name, although Ghana (formerly Gold Coast) and surrounding countries saw an ivory trade as extensive as Ivory Coast's (Feinberg and Johnson 1982).

Slaves, however, became the most wretched legacy of colonial trade with Ivory Coast. Of the estimated 12.5 million Africans displaced by the slave trade centered in West Africa, it is difficult to know how many shipped from Ivory Coast. Traders relied on native tribes to capture victims inland and transport them to coastal trading stations. A growing European revulsion against the slave trade—and a lesser need for enslaved labor—led most of Europe to ban the practice by the mid-1800s. The French had grown a presence in the Ivory Coast since their landing in 1637. In 1893, the region became an official French colony (Association Générale des Ivoiriens n.d.). The French introduced coffee as a commodity, but toward the end of the nineteenth century the rocketing growth in demand for cocoa led colonial entrepreneurs from several countries to move cacao farming from the Chocolate Islands of São Tomé and Príncipe to colonies on the coast.

Formal slavery was at an end, but reports of forced labor and child labor on Ivory Coast and other West African cacao operations continued to blemish the sector's reputation, as it did still in 2021. By the 1930s, West Africa already was becoming the world's dominant exporter of cocoa beans. French colonial reforms after World War II gave more rights to Ivoirians, including French citizenship, the right to political organization, and the formal abolition of forced labor. The Ivory Coast became an independent republic in 1960. Cocoa and other exports grew with prosperity and stability until 1982, when a fall in cocoa and coffee prices along with a drought hit the economy. A coup d'état in 2002 and civil war led to continued instability (Association Générale des Ivoiriens n.d.; Higgs 2012).

In 2020, desperately poor smallholders farming cacao had cut down the rainforest at a rate higher than neighboring countries. About 80 percent of the country's rainforests had already vanished, and along with them wildlife, particularly chimpanzees and elephants (Pearce 2019). The international ivory trade had long been banned, but the elephant population continued to decline, from 1,611 in 1994 to 225 in 2020 (Kouakou et al. 2020). A real danger existed of an Ivory Coast without ivory.

A variety of sustainability initiatives were launched to protect surviving rainforests and create a reasonable living standard for the estimated two million smallholders farming cacao in Ghana and Ivory Coast. In addition to government initiatives in 2020, ninety-two groups targeted 800,000 smallholder cacao farmers in an attempt to reduce poverty and slow environmental damage. But progress by the end of that year had been disappointing. The average Ivory Coast cacao farmer received about \$1.50 or less a day (Myers 2020). Child labor became a scandal after a 2000 British BBC documentary showed widespread forced child labor in Ivory Coast, much of it in the cocoa sector (Schrage and Ewing 2005). While a 2020 report showed progress in reducing this scourge, no one could claim that children were no longer working in the farms. Ivory Coast in 2014–2015 adopted a constitution prohibiting child labor and guaranteeing an education, but the government has been unable to reliably enforce its laws (U.S. Department of Labor 2019).

On a positive note, forced labor seemed to have been eradicated (NORC 2020). Ivory Coast, like all cocoa-producing nations, has limited control over the product as it is almost invariably exported before processing. Large multinational

commodities concerns such as Cargill, ADM, and Barry Callebaut established grinding operations in Ivory Coast. But these automated plants did not require a large workforce, so they were not of great help to ease poverty in the cocoa sector (Squicciarini and Swinnen 2016). Some small bean-to-bar operators have tried to establish a higher gate price, the price actual farmers receive for their cocoa, building on guaranteed minimums as established by large fair trade certifying organizations such as Fairtrade and Rainforest Alliance/UTZ. A notable smaller concern based in the Netherlands that has expanded to several countries, Tony's Chocolonely, in 2021 aimed to set a premium 39 percent above the Fairtrade farm gate price in Ivory Coast (Tony's Chocolonely n.d.). The largest multinational confectioners, sometimes nicknamed "big candy," have financed sustainability initiatives in a concern over climate change, political instability, corruption, and poverty in the supply chain of Ivory Coast and other cocoa-producing nations (Frydenborg 2015).

In October 2019, the governments of Ghana and Ivory Coast established a required Living Income Differential of \$400 a ton above market price to be paid to farmers in an attempt to address poverty. While major chocolate manufacturers supported the initiative, the pandemic of 2020–2022 saw demand for cocoa sink and supply chains disrupted. In early 2021, Ivory Coast farmers had piled up 100,000 tons of beans they could not sell, while some farmers tried to sell their beans below the guaranteed price. Some exporters admitted that the differential had made Ivory Coast beans expensive, encouraging them to seek beans from other sources, and suggested implementation should have been postponed when the pandemic hit (Aboa 2021; Uncommon Cacao 2020).

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J

Jesuits (Religious Order)

Jorge Mario Bergoglio, who beginning in 2013 has served the Roman Catholic Church as Pope Francis, was distinctive in two thousand years of papal history as the first pope from South America. He also was the first pope of the Jesuit community, a dominating force in the history of chocolate for two centuries. The Catholic order was established by Spanish priest (and former soldier) Ignatius de Loyola as the Society of Jesus. Its reputation as a militant arm of Catholicism to counter heretics of the Reformation grew to give the order great influence in Europe, particularly Spain and Portugal, but also caused great fear and loathing among detractors (Coe and Coe 1996; Squicciarini and Swinnen 2016). In the New World, Jesuits arrived along with other missionaries who in the 1500s set out to convert the Indigenous peoples after conquest. Jesuits were the most important religious men involved in the cocoa trade and among the first to describe cocoa. They were influential for cocoa's acceptance in the Old World.

Founded in 1534, the Jesuit order reached the Americas as Spanish missionaries shortly after several other orders, including Dominican and Franciscan. These missionaries worked to convert native populations by adopting local dress and customs, and as educated men learned native languages and observed native plants, animals, and culture. Significant early missionaries who introduced the world to cocoa included the Jesuit Joseph de Acosta, who joined the order in 1553. He sailed to Panama with a Jesuit missionary group in 1570, then traveled to Peru for his mission work (De Acosta [1590] 1604). In 1587, he returned to Spain with manuscripts he had written over his years in the New World, including *The Natural and Moral History of the Indies* (translated from Spanish by Edward Grimston in 1604). Of the earliest writing from the New World that included descriptions of cocoa, de Acosta's became one of the most well known of the period, translated into Dutch, French, Latin, and by 1623, German (De Acosta [1590] 1604).

The Jesuit missionary observed that the popularity of cocoa by this time had spread from the natives to the Spanish colonizers. "It is so much esteemed amongst the Indians (yea and among the Spaniards) that it is one of the richest and the greatest traffickes of New Spaine" (De Acosta [1590] 1604, 244). De Acosta admitted, however, that chocolate for Europeans was an acquired taste: "The chiefe use of this Cacao, is in a drinke which they call Chocolate, whereof they make great accompt in the country, foolishly, and without reason, for it is loathsome to such as are not acquainted with it, having a skumnie of froth that is very unpleasant to taste." But he admitted it was said to be "good for the stoinacke, and against the catarrh" (De Acosta [1590] 1604, 244).

De Acosta spent only a few pages of his natural history describing cacao, but perhaps the observation most significant to his Jesuit order affirmed that as a trading commodity it was both “richest and greatest.” It was that trade that gave the Jesuit order in the New World both of those benefits. The trade in cocoa also contributed to their eventual downfall.

Spanish conquerors in South America discovered wild cacao trees growing in the Amazon basin in Ecuador, Peru, and Brazil. They recognized the cacao as different from what they had first encountered in Mesoamerica, and so called it “forastero” as opposed to the familiar “criollo” (Frydenborg 2015). Jesuits apparently realized the increasingly popular bean could bring a fortune to their order. Their emphasis on developing medicines for Jesuit infirmaries and pharmacies included interest in native medicinal uses. They also extracted cocoa butter as a salve. The challenge was harvesting the wild cacao from remote rainforest regions. Jesuits began by coercing expeditions of native workers to travel into the jungle for the cacao harvest, but discipline over the workers was difficult in the forest, as unhappy natives could easily disappear. The order tried paying free natives, but this proved costly, and native worker populations dwindled from disease and overwork (Grivetti and Shapiro 2009). In 1537, the pope forbade enslavement of New World natives—but not Africans. Jesuits resorted to a labor supply of West African slave imports to both gather the wild cacao and to work the increasingly widespread Jesuit cacao plantations in Brazil, Paraguay, and elsewhere in the New World (Prinz 2017; Grivetti and Shapiro 2009). Jesuit cacao trade by the end of the 1600s grew prosperous enough to cover the cost of the order’s many colleges, its fees to the church, and its missionary operations. Documentation indicated that they continued to buy and sell slaves for cacao plantation work in Oaxaca, Mexico, and for processing in Maranhão, northeastern Brazil (Grivetti and Shapiro 2009; Walker 2007).

The Jesuit order’s extensive operations and knowledge of cocoa are thought to have been a major factor behind the spread of the exotic beverage to Spain and the rest of Europe. The order offered chocolate as a gift from the New World to clergy in the network of Catholic monasteries, as well as supplies to the pope himself (Norton 2006). The most influential early introductions to cocoa published in the 1600s relied extensively on Jesuit knowledge: Antonio Colmenero de Ledesma, whose 1631 treatise on chocolate became the equivalent of a European best seller, had served as a medical doctor on a Jesuit mission to Mexico. British writers, notably Stubbe and Gage, gave credit in their work to Colmenero. Dufour in France cited Colmenero as well as other authorities in his 1671 work; most of those referenced had been part of Jesuit missions (Jones 2013; Dufour 1671).

Jesuit missionaries to the Philippines established cacao operations that became the first known Asian-based cocoa, still a popular Philippine crop today. The Jesuits themselves also became enthusiastic cocoa drinkers, but in this habit, they came into conflict with other Catholic orders who differed on the fasting rules of Roman Catholicism. The concern in the Catholic world was based on the principle of self-denial during Lent and before Mass. While beverage consumption was acceptable, food was not. Was chocolate a food or beverage? A strident debate

among church leaders lasted for more than a century. Jesuits had established an obvious financial benefit in encouraging the consumption of cocoa and so declared that it did not break the fast. They argued its stimulating qualities kept the faithful awake during long services. Members of the Dominican order were not persuaded. They responded that not only is chocolate an aphrodisiac that could lead to unholy temptations but also that it is an enjoyable drink, and so runs counter to the aesthetic ideal of fasting.

In 1569, Pope Pius V was asked to resolve the dispute by tasting a cup of chocolate. He apparently did not take the unfamiliar beverage seriously enough to rise above contempt, concluding with apparent disdain that “this stuff doesn’t break the fast” (Jesuits in Britain 2017). That apparently was not a convincing display. The debate continued until a Jesuit-educated Italian cardinal, Francesco Maria Brancaccio, produced a treatise of medical arguments in 1662 declaring that its health-giving properties should make cocoa permissible. Pope Alexander VII agreed with a 1666 decree that ended the debate, but with a compromise affirming the health argument: the cocoa could be mixed with water only, no milk or sugar (Korten 2017; Lippi 2013; Jesuits in Britain 2017).

Jesuits may have won this ideological battle, but a century later the order faced disaster and destruction of their profitable cacao operations in the New World. In 1767, Charles III of Spain expelled the Jesuits from the Spanish colonies. The order had already been expelled from Portuguese colonies in 1759 and from France in 1762. It was suppressed by Pope Clement XIV in 1773. Reasons behind the suppression defy easy explanation. The order’s wealth and independence posed a threat to the Spanish and Portuguese Crowns, while rival orders and an increasingly secular world encouraged conspiracy theories and propaganda against the order. It was made a scapegoat for the Lima earthquake of 1755. A squabble over taxes to the Spanish Crown led to a lawsuit and revelations of fraud and “shocking wealth.” Much of that wealth was presumably based on the success of the order’s extensive cocoa trade (Mörner 1966, 158; Shore 2020; Korten 2017). The growth of unsubstantiated conspiracy theories against the internationalist Jesuits included a new one after Pope Clement XIV banned the order: that in revenge Jesuits had slowly poisoned the pope through his chocolate. Clement had shown fear of assassination and took ill after the suppression decree. He died in 1774, at the time widely presumed to have been the victim of Jesuit retribution. A later autopsy proved this rumor to be false (Papal Artifacts 2018; Coe and Coe 1996).

Nevertheless, chocolate in eighteenth-century Europe came to be associated with a scandalously idle lifestyle of Catholic aristocracy and clergy. A familiar painter’s theme of the era depicted a languorous woman of apparent noble bearing taking her morning chocolate in the presence of priests (Squicciarini and Swinnen 2016; Coe and Coe 1996). Perhaps history’s most famous depiction in literature of self-indulgent Catholic clergy and chocolate can be found in *A Tale of Two Cities* by Charles Dickens, the Catholic monseigneur absurdly requiring “the aid of four strong men besides the cook” to serve his chocolate (Dickens 1859). Pope Pius VII restored the Jesuit order in 1814, and its missionaries returned to the Americas. But they did not rebuild their trading empire in chocolate.

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L

Lecithin

See Vegan Chocolate

Lindt, Rodolphe

See Conch, Conching

Linnaeus, Carolus

The father of botanical taxonomy gave the world a scientific name for the cacao tree, along with twelve thousand other plants and animals, in his *Species Plantarum*, published in 1753. Carl von Linné, while a student at the University of Leiden, turned to working up a simplified and consistent way to classify living things as a response to his medical training. Doctors at the time needed extensive knowledge of botanicals and existing nomenclature was long and difficult to remember (Sarchet n.d.; Austin 1993). The Swedish student devised a relatively simple and consistent way of classifying all living things by use of two Latin words, their genus and species. Writing mostly in Latin under his own name in Latinized form, Carolus Linnaeus extended his binomial nomenclature system to cover a great number of organisms known at the time, including many new ones from the Americas. Today the nomenclature, sometimes in revised form, is still used, with the abbreviation L. indicating an original Linnaean classification.

One of those original names refers the source of chocolate: *Theobroma cacao* L., “food of the gods called cacao.” The Mayans’ ancient name for the tree that produced the drink was *cacao* (History Daily 2019; Grivetti and Shapiro 2009). Linnaeus’s basis for naming the tree *Theobroma*, however, is less certain. We know Linnaeus appreciated chocolate, as he wrote of its health-giving effects. A physician by (modest) training, Linnaeus considered chocolate helpful to treat lung and muscle diseases, hypochondria, hemorrhoids, weight loss, and, reverting to the centuries-old legend, as an aphrodisiac (Grivetti and Shapiro 2009; Lippi 2015). One can presume, then, that he called it “food of the gods” for its wondrous flavor and qualities. But historians of science have noticed that the great taxonomist’s work is riddled with an impish sense of humor and irony. He came up with names based on former students and professors, history, foreign languages, and odd descriptions. *Rudbeckia* (black-eyed Susan) was named after his old professor Olaf Rudbeck. *Glaucomys Volans*, the flying squirrel, “white mouse that flies.” He may have been in a droll mood when he named human beings *Homo sapiens*, “the

wise one.” And considering chocolate’s reputation in the 1700s as a drink for the idle wealthy, his “food of the gods” may have had a double meaning (Austin 1993).

In a confusing oddity, *Theobroma* resembles *Theobromine*. The latter is a bitter-tasting alkaloid found in cocoa and chocolate. It is the chemical we crave (or abhor) in the drink or confection, working as a mild stimulant. It has nothing to do with Linnaeus’s taxonomy of the cocoa tree (Kunisuke et al. 2010).

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M

María Theresa (Marie-Thérèse)

The early years of chocolate's introduction to France include charming legends and anecdotes often repeated today on chocolate-lovers' websites. But the evidence for them often is scant and the research conflicting.

We do know that the queen of France who, in an arranged marriage, joined Louis XIV in 1660 consumed chocolate at the court. This would stand to reason: Marie-Thérèse, born María Theresa, had moved from the Spanish court to Versailles as part of a peace treaty between the two countries. The 1659 Treaty of the Pyrenees to end the war between Spain and France included union of the Spanish Habsburg house and French Bourbon house through a royal marriage. Louis XIV was the groom; María Theresa, daughter of Philip IV, became the bride. Her father, king of Spain, began each day with "an early cup of chocolate" (Hume 1907, 144). Contemporaries described María Theresa as shy, naïve, religious, and a chocolate lover like her father. Court observers affirmed that she greatly admired the French king and her duties as mother of the dauphin, the future Louis XV (Château de Versailles n.d.).

María Theresa, with deep Spanish roots, accepted her forced marriage with reticence, struggled to learn French, and took with her to the French palace an entourage of Spanish ladies-in-waiting, including two who could prepare her chocolate "in the Spanish style" (Grivetti and Shapiro 2009). Some historical evidence suggested it was she who brought chocolate's popularity to France, contending its consumption began with the French court and spread to the aristocracy and wealthier French. Evidence for María Theresa's role in the spread began with her reputed gift to Louis XIV on her betrothal, a decorated chest filled with chocolate. It is sometimes contended that the king became an instant chocolate fan and so brought it to the attention of the rest of Europe (Mingren 2018). Other historians note, however, that the Spanish queen took her chocolate in secret, and that Louis XIV did not much care for the beverage, in 1693 forbidding its court service after María Theresa's death (Grivetti and Shapiro 2009; Coe and Coe 1996). Evidence contradicting the king's disdain, however, can be found through a 1687 treatise published by Nicolas de Blégny's that included an enthusiastic examination of chocolate's benefits (De Blégny 1687). De Blégny was from 1687 first physician to Louis XIV. He had also been beginning in 1678 physician to María Theresa (Nicholls 1934).

Louis XIV may or may not have loved chocolate; but the likelihood that the queen was responsible for extending chocolate's popularity to France is questionable based on circumstantial evidence. Spanish physician Antonio Colmenero de Ledesma's popular 1631 book on chocolate by 1660 had been long-available in

French. In 1643, prominent Paris physician René Moreau published a translation of Colmenero's book. Moreau noted in the introduction that by then chocolate had already gained a "very great reputation" in France and beyond (Moreau, in Colmenero 1643, 1–2). Stronger is the evidence that European monasteries, and not the French court, can be credited with spreading the popularity of chocolate throughout Europe. However, tying these two threads, an argument for chocolate's spread from clergy to court to aristocracy can be found in Moreau as well. His preface dedicated his translation to "the cardinal of Lyon." That cardinal, Alphonse de Richelieu, was the brother of Louis XIV's famous chief minister, who asked Alphonse for advice regarding the medicinal advantages "of this foreign drug" (Moreau, in Colmenero 1643, n.p.). That would have had to occur before 1643, and therefore before the accession of Louis XIV, who began his reign in May 14, 1643.

Could chocolate have therefore been introduced to the French court before Louis XIV? It seems probable. But we have no evidence beyond an anecdotal, if charming, story of Louis XIII and another queen from Spain, Anne of Austria (who was Spanish, but of the Habsburg family). It is a story frequently repeated on chocolate-lovers' websites. In 1615, much earlier than the date of Colmenero's work, the fourteen-year-old Anne presented an expensive and exotic substance, chocolate, to her future husband Louis XIII, also aged fourteen (Marsh 2021). From there, it spread to the court and the rest of France. However, historians have noted that the couple detested each other, never ate together, and detailed records of the king's dining showed no mention of chocolate (Grivetti and Shapiro 2009).

Historians have traced this Anne of Austria legend to Jean Anthelme Brillat-Savarin. The French gourmet in 1825 published what is sometimes considered the most important book in culinary history, *The Physiology of Taste*. Brillat-Savarin boosted chocolate's attraction through several pages of approving text, touting its many health benefits (Brillat-Savarin [1825] 1848). He recounted the Anne of Austria legend, but almost as an offhand remark, including no evidence, and so suggesting he may not have believed it himself (Brillat-Savarin [1825] 1848).

María Theresa was supposedly a bit too Spanish for the French court, which floated harsh gossip of her dissolute character and behavior. One rumor claimed that in 1664 she gave birth to an illegitimate "black baby," though historians suspect the female infant was actually born with purplish-colored skin from oxygen starvation. The baby died soon after birth. However, rumor also claimed the girl actually survived, was hidden, and became a nun. Historians have proven this to be false (Mingren 2018; Schmidt 2016). But mean-spirited remarks against the Spanish chocolate-loving queen included comments such as one recorded by Marie Elisabeth-Charlotte, duchesse d'Orléans, who was married to Louis XIV's younger brother. "Her teeth were very ugly, being black and broken. It was said that this proceeded from her being in the constant habit of taking chocolate; she also frequently ate garlic" (Elisabeth-Charlotte, Duchesse d'Orléans 1899, 103).

María Theresa is remembered as being devoted to her husband, despite her humiliation at his frequent affairs, and accompanied him on all formal visits. Unfortunately, she fell ill after a 1667 trip to Burgundy and Alsace and died

suddenly, probably of sepsis, at age forty-four. The king reportedly responded to the death of his shy and devoted wife with the callous remark, “This is the first time she’s caused me any bother” (Château de Versailles n.d.).

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Mars Wrigley (USA)

A typical American grabbing a quick chocolate snack at a service station or grocery counter display has normally two main choices: Hershey or Mars. The two have ruled the U.S. snack chocolate market since the 1940s, archrivals, battling for first place in market share. Sometimes Hershey’s has had the upper hand. Sometimes it has been Mars. Together they command nearly three-fourths of that market in the United States (Wunsch 2021). But as companies, their histories and corporate cultures are strikingly different. In particular, Mars has been dominated by family dynamics since its founding more than a century ago. It continues today as a family-owned business, famously so. In 2021, Mars was one of the largest family businesses in the United States, with yearly worldwide sales of \$40 billion. In 2020, *Forbes* rated it as the third richest “dynasty” in America, the family worth \$89.7 billion (Hofflower 2019; Forbes 2020). In 2021, the International Cocoa Organization listed Mars as the world’s number one manufacturer of chocolate (ICCO 2021).

Franklin C. Mars was born in 1883 in Glenwood, Minnesota. According to the company's official history, he learned to make candy from his mother after a bout with polio left him unable to be as active as other children. He walked with braces and later a cane (Mars Edge n.d.; Brenner 1999). In 1902, Mars married a Minnesota teacher. In 1910, the marriage ended in divorce, as Mars's first candy business was failing, and his wife left claiming nonsupport.

Frank Mars married Ethel Veronica Healy soon after the divorce, and the next year moved to Seattle, Washington, where Mars launched a confectionary business selling hand-dipped butter creams. The company failed; he moved to Tacoma, Washington, to try again, but that business also failed. In 1920, he returned to Minnesota (CooksInfo 2009; Companies History n.d.; Historical Society 2003; Brenner 1999).

The company's own history and other histories give the date of 1911 as beginning of the Mars company, but after his return to Minneapolis in 1920 he established an entirely new firm, with an entirely new product, the Mar-O-Bar company, later incorporated as Mars, Inc. Mar-O-Bar's success was limited as the confection apparently did not transport well. The butter creams that he had tried on the West Coast sold better, putting the business on a solid footing. In 1923, the company launched a new candy bar based on the popular malted milkshake of the time: Milky Way. Its success led Mars to leave Minneapolis for a larger operation closer to transport hubs in Chicago, already home to many confectionary makers. In 1930, Mars introduced the Snickers bar. In 1932, it introduced 3 Musketeers (Mars Edge n.d.; Brenner 1999).

But arguably the greatest innovator who brought Mars to the pinnacle of the confectionary titans was not Franklin C. Mars. It was his son, Forrest E. Mars Sr., born in 1904 in Wadena, Minnesota, to Ethel G. Kissack, Frank Mars's first wife. After the divorce, she was awarded custody of Forrest, but with little money and no alimony from Frank that she had been promised, she reluctantly sent the boy to live with her parents in rural Saskatchewan. As a child, Forrest seldom saw his mother and never his father (CooksInfo 2009; Brenner 1999).

Family dynamics need referencing because the company's father-son entanglements became formative to its phenomenal growth. As an adult, Forrest renewed acquaintance with his father, almost a stranger, in Chicago while working as a Camel cigarette salesman in 1923. Forrest joined his father's firm in 1929. Some historians described differences between father and son as a "stormy relationship"; a 2019 history simply acknowledged that Forrest "fell out with his father" and was encouraged to pursue other business interests (Hofflower 2019; Reference for Business 2021; Hays 1999). Forrest later claimed that it was he who, while drinking a malted milkshake, proposed to his father a product that became the company's iconic Milky Way bar. Its enormous success turned the company into a growing American giant (Forbes 2020; Hays 1999; Brenner 1999). Still in his twenties, Forrest pretentiously declared that he wanted to make his father's chocolate company "a global powerhouse" (Hays 1999, B7). After disagreements with Frank regarding how Mars, Inc., should be run, his father had had enough and invited him to pursue business elsewhere. "Things got bitter," recalled Forrest. "And I'm not proud of this. I told my dad to stick his business up his ass." In 1932,

on his departure Forrest was given start-up money, the Milky Way recipe, and foreign manufacturing rights (Hofflower 2019; Reference for Business 2021; Brenner 1999, 60).

Forrest left the country. He worked for other European chocolate firms before establishing Mars Limited UK in Slough, near London (CooksInfo 2009). From a small kitchen, he launched a chocolate confection similar to the Milky Way, the Mars bar (a different bar with the same name was later introduced in the United States featuring nougat, toasted almonds, and milk chocolate; it was discontinued in 2002, but returned in 2003 as Snickers Almond) (Mathers 2020).

A second business interest grew to become as significant to the company today as its confections: canned pet food. The idea of separate canned food for dogs and cats was new to the 1930s. Mars built the division to become a significant segment of the business. In 2019, Mars Petcare Inc. was the world's top seller of pet food, controlling brands including Pedigree, Iams, and Royal Canin. (Second largest was Nestlé, also a top player in the chocolate industry.) (Petfood Industry.Com 2021).

Forrest had been in the United Kingdom for only two years when his father died, but he stayed until 1940 to build his business separate from the family name. In 1940, to escape new British taxes he returned to the United States. The Mars namesake company in Chicago was by then run by Frank's widow and family, so Forrest kept a separate company, Food Manufacturers Inc. The companies did not merge under Forrest's control until 1964 following bruising boardroom battles that almost sunk Frank's original firm (Hays 1999; Brenner 1999).

On the eve of World War II in 1941, Forrest Mars developed what became the company's most popular chocolate snack, by 2020 outselling any U.S. competitor's product, including those of Hershey. M&M's started out as Mars's response to the continuing problem of shipping and selling chocolate-based products in warm months. Without air conditioning, many retailers avoided stocking chocolate in the summer. For support, Mars approached R. Bruce Murrie to suggest a partnership. Murrie presumably brought familiarity with chocolate production to the team; he was a son of Hershey Company president William Murrie, later to become Mars' archrival. The younger Murrie, seeing no future in Hershey, had become an investment banker before agreeing to join Mars. But despite Murrie's critical contributions to what became the chocolate company's most famous product, Mars treated his associate in the same brusque, condescending, and imperious manner that he gave to all of whom he called his "associates" (Brenner 1999).

The M&M's legend began during Mars's years in Europe. Mars purportedly took inspiration based on a chocolate confection he had seen soldiers eating during a Spanish Civil War battlefield tour. It was called Smarties and manufactured by the British chocolate maker Rowntree (now owned by Nestlé). The head of Rowntree reportedly later made an agreement with Forrest Mars for U.S. manufacturing rights. The Mars company in 1999 declared this legend to be false, that Mars did not copy Smarties (Brenner 1999). However, skeptics observed that Rowntree introduced Smarties in 1937, that Forrest did tour Spanish battlefields with a Rowntree staff member, and that the subsequent American candy looked an awful lot like Smarties. Rowntree's director, George Harris, sought out a meeting

with Forrest Mars in Slough around 1933; the two reportedly joined forces in an attempt to compete with Cadbury, then the dominant force in British chocolate. Clearly an early link existed between Rowntree and Mars that would suggest the Rowntree product served as a pattern for M&M's (Cadbury 2010).

Partners Mars and Murrie introduced their lentil-shaped milk chocolate product in a hard candy coating that could transport well and even stay in the consumers' hands and pockets without melting. They named the product after their own initials: M&M's (the brand name is always spelled with the apostrophe). The colorful candy-coated milk chocolate by 2000 had grown to become the world's most popular confection (Brenner 1999; Reference for Business 2021; Hays 1999).

Mars's timing was impeccable. The U.S. Army was working to develop a chocolate product that could survive hot weather and rough handling. M&M's was a solution. Its production was exclusive to the military until the end of the war, when in 1945 M&M's was introduced to the public. Sales climbed slowly, and so in 1950 Mars asked the Ted Bates & Co. advertising agency to consider a new approach. In response, agency head Rosser Reeves in 1954 created one of the most famous advertising slogans in American history: "The milk chocolate melts in your mouth—not in your hand." By 2021, M&M's had grown to a global brand worth \$1 billion; 400 million of the colorful confections tumble off Mars conveyer belts every day (Brenner 1999; Forbes 2020; Reference for Business 2021).

Mars had branched out from confections by World War II not only to pet food but also in other foods. His 1943 patent for an easy-to-prepare rice, Uncle Ben's, attracted attention of the U.S. military. After the army tried unsuccessfully to overturn the patent, Mars reportedly became more publicity-shy, almost never granting interviews and avoiding photographers (Hofflower 2019). A 1984 *Forbes* story cast him as "one of this century's most brilliant and successful entrepreneurs" but also "an irascible candy-maker with a fetish for privacy." He was known as temperamental, continuing to criticize business decisions of his sons John and Forrest Jr., who took over after his 1973 retirement. But he was also known to be generous to employees who performed well for the firm. The Mars company continued to maintain a well-documented reputation for secrecy and refusal to engage with the public or issue reports of its operations. In 1999, Forrest Mars Sr. died at ninety-five. The company provided no details and would not talk to the press (Hays 1999, B7; Brenner 1999; Companies History n.d.).

However, in recent years, the family has lifted the curtain a bit under board chairman Stephen Badger, son of Jacqueline Mars and grandson of Frank Mars. Regarding the family's "reluctance to engage," Badger told a *Washington Business Journal* reporter in 2018, "We made a very conscious decision after quite a lot of discussion and disagreement over many years to fundamentally shift what had been a tradition for essentially 100 years, to pivot and engage the external world." In an interview—a rarity for the Mars family—Badger admitted of his company that "some would call it secretive," but pointed out that Mars Inc. had always been visible through its advertising. Now, however, "We've also recognized that there are some issues that are so significant, they warrant our participation in terms of putting ourselves into the dialogue" (Terry 2018, n.p.).

Mars in recent years has aggressively worked to expand both its product lines and its research on cocoa health and ecological sustainability. In 2016, it merged

with Chicago confection manufacturer Wrigley, becoming Mars Wrigley Confectionary. In 2020, declaring “the cocoa supply chain is broken,” Mars launched its Cocoa for Generations program. The company committed \$1 billion in the next decade in an effort to improve the lives of smallholder cacao farmers, preserve rainforests, protect children from exploitation, and create a sustainable supply chain for cocoa (Mars 2020). However, governments of Ghana and Ivory Coast, the world’s largest cocoa-producing countries, in 2020 accused Mars and other large manufacturers of changing buying patterns to avoid paying government-mandated Living Income Differential (LID) premiums for farmers’ cocoa beans. Mars denied the charge (Myers 2020).

Mars in 2015 committed resources to a wide variety of research regarding possible health benefits in chocolate (Mars Symbioscience n.d.). It has sponsored a chair in nutrition science at the University of California Davis and a variety of conferences throughout the world (Belluz 2018). As some recent research has questioned some of the original promise of chocolate itself as a health food, Mars has launched a line of cocoa-based supplements, CocoaVia, as a way for consumers to take advantage of cocoa’s possible health benefits in concentrated form. In recent years, Mars has concluded that too few flavanols remain in actual chocolate after processing, and so its benefits may be limited (CocoaVia 2021; Nieburg 2018).

Mars grants have supported research beyond the science and health of cocoa. From 1998 at UC Davis, Mars money has encouraged a variety of cocoa research in many disciplines. *Chocolate: History, Culture and Heritage*, published in 2009 with Mars grant funding, brought together a team of 115 researchers to produce fifty-six scholarly articles covering many facets of cocoa history and industry (Grivetti and Shapiro 2009).

The private Mars family faced unexpected and tragic public attention in 2013. Jacqueline Badger Mars, the family matriarch and daughter of Forrest, driving an SUV near Washington, DC, crossed the center highway line and crashed into a minivan, killing a passenger and seriously injuring the driver, who was eight months pregnant and lost the unborn child. Mars said she fell asleep while driving. Tests revealed no drugs or alcohol, and witnesses said Mars was not speeding or driving erratically. Pleading guilty to a charge of reckless driving, she was fined \$2,500 and given six months’ driving suspension. Mars issued a statement indicating her remorse, saying “I will always live with the grief and loss caused by this tragedy” (Gibson 2013).

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Maya, Mayans

Chocolate in history tends to be most strongly associated today with the Aztec culture, perhaps because it was the powerful empire that dominated Mesoamerica when the Spanish conquistadors arrived in the early 1500s. But its origin in ancient cultures of the New World reaches back far earlier. Cocoa's rise to a Central American cultural centerpiece began in an empire of the Yucatán and Tabasco regions that had fallen six hundred years before Columbus. Its influence in cocoa history remained: it was the Maya who first introduced Europe to cocoa.

At least this is the first solidly documented introduction. Kekchi Maya nobility from today's Verapaz region of Guatemala accompanied Dominican friars in 1544 on a first visit to the Old World. For a meeting with Spanish king Philip II, Maya gifts included cocoa beans and jars of chocolate. How the seventeen-year-old king responded to the gift we do not know. We do have a solid historical record crediting Dominicans and other Catholic orders with early New World chocolate production, shipping, and distribution throughout the European network of monasteries (Southern Belize 2021; Frydenborg 2015; Coe and Coe 1996).

As significant, research indicated that it actually was not the Aztecs who introduced early Spanish colonists themselves in the New World to cocoa. It was the Maya of the Yucatán peninsula and areas of Central America (Coe and Coe 1996; Valdez et al. 2002). Acceptance grew as early Spanish colonization encouraged intermarriage with natives, many of them Maya. The creolized culture that arose included Maya women as traditional preparers of chocolate, playing influential roles as wives, servants, and nannies (Norton 2006).

Recent archeological fieldwork has debunked the presumption that cocoa did not appear in Maya civilization until its classic period (AD 250–900). That proved to be incorrect by about one thousand years based on discoveries in northern Belize. An analysis of spouted ceramic containers showed traces of theobromine, a marker for cacao as it is the only Mesoamerican plant containing it as primary methylxanthine (methylxanthines are a class of drug from which stimulants such as caffeine and theobromine are derived) (Valdez et al. 2002). As early as 600 BC, the Maya were consuming chocolate. While their empire disintegrated around AD 900, possibly due to overpopulation, environmental pressure, and warfare, the Maya native people continued to produce and celebrate a cocoa culture. Likely the Maya also introduced cocoa to the Aztecs, the people of central Mexico who rose to power more than four hundred years after the fall the Maya Empire. The Aztec Empire demanded as tribute to its power cocoa beans, mostly from the Soconusco region now in southern Mexico. The profitable practice was co-opted by the Spanish conquistadors. This system, too, probably began with the Maya Empire (McAnany and Murata 2007; Presilla 2009). Cortés originally called the unfamiliar beverage cacao, a Mayan and not an Aztec word (Coe and Coe 1996). So, while the older empire may have been long gone by the time Columbus landed, the Maya civilization of Mesoamerica can reasonably be credited as the cradle of cocoa civilization.

But Maya must share credit for early cacao use with an even earlier culture, the Olmecs. This empire reached the height of its power hundreds of years before the beginning of the Christian era in Europe. Pottery shards from the Olmec capital of San Lorenzo (in modern Mexican state of Veracruz) showed chemical traces of theobromine, with archaeological evidence indicating cacao played a role in an elite rite of human sacrifice that was part of Aztec culture when the Spanish landed. Cacao, we now know, was consumed by at least 1800 to 1600 BC. We know from archeological evidence how the ancient Maya consumed it, valuing its froth as the most desirable part of the drink, as early as 600 BC. We do not know how the Olmecs consumed it. We presume it was in liquid form, but it may have been as a fermented beer (Powis et al. 2011).

Maya culture by the early 1500s had standardized its consumption of chocolate to become both a ritual and an everyday drink. Unlike the Aztecs, who limited its consumption to the elite, Maya of all classes consumed it with most meals. It was typically mixed with water, maize, chili, and/or honey for a variety of drinks. Sahagún, an early Spanish observer, said it included “ground-up dried flowers,” probably ear flower (*Cymbopetalum penduliflorum*), described as tasting like slightly bitter black pepper. Annatto (*achiote* in Spanish) often was added to impart a reddish color and light flavor sometimes compared to paprika. This may have symbolized blood of a sacrifice ritual (Valdez et al. 2002; Norton 2006; Presilla 2009). In formal use, froth was raised by pouring the liquid just before serving from a high vessel to another for an impressive visual effect. While Maya consumption was ubiquitous, it was apparently limited to adult males, as the stimulating beverage was apparently considered unsuitable for women and children (Grivetti and Shapiro 2009; Maya at Mexicolore n.d.).

Maya medicine included an extensive list of cocoa’s health benefits, ideas picked up by the Aztecs, and from them, the Spaniards. The Maya included cocoa in ritual use for both baptism and funeral rites, and used cocoa beans as currency (Thompson 2015; Frydenborg 2015; Lippi 2015). Maya today prepare the drink sweetened or unsweetened, hot or cold, normally without milk and “resembling a richly chocolate-flavored coffee” (Southern Belize 2021).

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Menier chocolate (France)

See Debaube & Gallais (France)

Mesoamerica

For centuries, we presumed cocoa originated in parts of Central America, a beverage introduced to the rest of the world through Spanish colonization. These areas of modern central Mexico, Guatemala, Honduras, Belize, El Salvador, Nicaragua, and Costa Rica shared cultural traits of the Nahua ethnic group. Traits included a common Maya language family, religious practices, and food shared among cultures of the Olmec, Maya, Zapotec, Teotihuacan, Mixtec, and Mexica (Aztecs). The generalizations came under the umbrella term “Mesoamerican” based on a word coined by anthropologist Paul Kirchhoff in 1943 (Kilroy-Ewbank 2021; Creamer 1987). But subsequent research has given the term less precision. It actually covers a huge geographic swath of Central America that includes mountains, deserts, tropics, and coastal plains. Language roots may be shared, but scores of actual languages (up to 125) were spoken. Still, researchers have not abandoned Kirchhoff’s umbrella term as it offers a handy shortcut to describe related cultures of this region.

As for food choices, Mesoamerica introduced to the world such common foods as corn, tomato, avocado, vanilla, and, of course, chocolate. Chocolate rose to the very pinnacle of prestige in the cultures of Mesoamerica. It was so coveted by the Aztecs that they conquered cocoa-producing areas to demand tribute in the cocoa beans that could not be grown in the capital of Tenochtitlán (modern Mexico City). Cocoa became part of elite society, treasured by Aztec kings, central to rituals of birth, marriage, death, and sacrifice. But it also was an everyday preparation of the Maya Empire. It was grown mostly in the humid tropical lowlands where cacao thrived, notably the regions of Soconusco and Tabasco in modern Mexico, and adjacent Pacific coast regions of modern Guatemala (McNeil 2006; Mcanany and Murata 2007). But recent research has concluded that longtime presumptions were wrong; the cacao tree itself did not in fact originate in Mesoamerica.

We know now based on genetic research that all cacao evolved in the tropical rainforests of the upper Amazon basin of Peru, Brazil, and Bolivia, and the Orinoco River that flows through modern Colombia and Venezuela (Chin et al. 2013; Grivetti and Shapiro 2009). We do not know, however, how Indigenous people of that South American region used cocoa—if they used it at all. They may have eaten the pulp as both a sweet food and fermented beverage, as we suspect the Mesoamerican Olmecs did. Researchers disagree regarding whether they extracted the beans and discovered the process to produce chocolate (Powis et al. 2011; Grivetti and Shapiro 2009; Chin et al. 2013).

But widespread archeological evidence tells us that the peoples of Mesoamerica consumed bean-based chocolate at least by the Maya Classical period, AD 250–900. The chocolate traditions that have conquered the world began therefore in Mesoamerica, the cradle of chocolate.

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Metate

The seeds of the cacao tree have no obvious resemblance to the chocolate the world loves. Early Mesoamericans found them to be bitter with no flavor resembling cocoa. Probably ancient Mesoamerican natives instead relied on juice from the pod's sweet mucilaginous pulp surrounding the seeds. This could be separated and fermented to produce alcohol. Possibly the earliest natives until about 1400 BC relied on this to make a beverage from the cacao pod (Chin et al. 2013).

But archeologists have found solid evidence that from about 1000 BC Maya were producing a cocoa drink from the seed, fermented and dried to become the familiar cocoa bean. But the bean was still nearly inedible without further processing. Part of that was the roasting, then separating the lighter husks from the bean. The more back-breaking part was grinding the beans into a usable paste.

Stone food-grinding slabs called *metate* ("muh-taa-tee") used with a *mano* ("mah-no," hand grinder) date from prehistoric times and have been found around the world, including North America, China, and India (Mississippi Valley Archaeology Center 2021). In the Western Hemisphere, the kitchen tool far predates evidence of use for cocoa beans, serving mostly to grind corn and grains from 7000 BC. The surface, usually carved from porous volcanic stone, traditionally became a tool for women who worked kneeling on the ground (Aztecs at Mexicolore n.d.). The modern word itself derives from the Nahuatl (Aztec) *metlatl* (Jones 1991).

While the metate served many kitchen uses, it became a central focus for chocolate making in pre-Columbian Central America. From there, versions moved to Europe and North America to serve the same function. The broken beans, called nibs, were ground with the mano in a motion somewhat like using a rolling pin. Nibs turned to a paste as they were crushed, bringing out the fat (cocoa butter) that makes up about half of a typical cocoa bean. Maya women used a heat source under the stone to encourage the paste to form. Maya and Aztec additions during

grinding often included honey, corn masa, flowers, chili peppers, vanilla, and annatto. Europeans added sugar, cinnamon, black pepper, anise, or traditional Mesoamerican spices. The cocoa paste (today usually called cocoa liquor in the United States, cocoa mass in Europe) became shiny when ready, was formed into gritty cakes, and kept for later use in cocoa drinks (Chin et al. 2013; Mcanany and Murata 2007; Coe and Coe 1996).

Hand-grinding the nibs took time and produced a slightly gritty cocoa product. The task of rolling cocoa beans continually over a hot metate likely attracted no one, and so as the process was adapted to Europe, servants would usually be required to take over the tedious work. In North America, the task was often given to slaves, some of whom specialized in cocoa preparation (Grivetti and Shapiro 2009).

Europeans began to abandon the stone metate as mechanical processes replaced the hand-ground product in the late 1700s. The resulting chocolate was still gritty, however, until Rodolphe Lindt invented conching in the later nineteenth century. Today metates are still widely available, and sometimes the process is still part of traditional chocolate-making demonstrations in Guatemala and other cacao-producing countries. In 2021, one U.S. manufacturer, Taza Chocolate of Somerville, Massachusetts, offered chocolate prepared in the traditional way on a stone metate (www.tazachocolate.com).

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Military Campaigns and Expeditions

The fat that makes up about half of cocoa liquor or cocoa mass, called cocoa butter, is one key to chocolate's attraction through centuries of military and expeditionary use, and for emergency rations or in lifeboats. Cocoa butter is a nearly equal combination of palmitic acid, stearic acid, and oleic acid. As a fat it is



World War I saw extensive use of chocolate both as a treat and as an emergency ration called the Red Cross Wheat Bar. The original caption for this photo reflects the apparent enthusiasm of soldiers: “Do they like chocolate? Ask the American Red Cross lady after one of her visits to the American Base Hospital at St. Denis.” The photo is dated September 1918 and credited to a well-known photographer of the period, Lewis W. Hine. (Library of Congress)

particularly stable, unlikely to mold or turn rancid. Chocolate also contains protein and carbohydrates, and 100 grams will fulfill 50 percent of the body’s daily copper requirement. Milk chocolate has a fairly high level of calcium (Mulhollem 2015; Miller 2021; Beckett 2000). It is a handy calorie-dense food for soldiers, explorers, and survivors. And people like it.

But the modern bar of chocolate has a downside as a soldier’s and explorer’s ration: it melts. And even in the twenty-first century, cocoa researchers have struggled to come up with a satisfying solution.

Mesoamerica is the cradle of chocolate, a substance both sought-after and familiar to native peoples hundreds of years before Columbus landed. Aztec and Maya armies favored its use during campaigns. Typically, it would be carried in cakes or balls mixed with toasted maize for complete nourishment and the energy boost of the stimulating theobromine (McShea, Leissle, and Smith 2009). While it was typically grated to prepare a beverage, in a pinch the gritty cakes could be eaten straight.

Europeans introduced to chocolate in the 1500s realized its possibilities for soldiers, and so extended the native custom through the centuries until today. Early observer Henry Stubbe wrote in 1662 that English soldiers in Jamaica lived on paste from the cacao bean mixed with sugar and dissolved in water (Dillinger et al. 2000). The “perfect food” accompanied both the British and colonial troops

during the Revolutionary War as well as both sides during the U.S. Civil War. Napoleon reportedly carried it into battle. Soldiers bereft of other food could sustain themselves for an entire day on an emergency meal of chocolate.

Chocolate greeted British sailors as a dietary supplement beginning in 1780. Captain James Ferguson was credited with recognizing nutritional qualities, possibly as it was reported to treat scurvy. He was not completely misguided; chocolate does contain Vitamin C, though only in trace amounts. Beginning in 1824 the British navy added a requirement of chocolate to all rations. Called “kye” in naval slang, possibly for initials of “Chocolate Issue,” its old-fashioned method of grating the cake into a cup and adding hot water for a product gleaming with fat did not change for 150 years—modernized finally in 1968 to cocoa powder (Squicciarini and Swinnen 2016; Grivetti and Shapiro 2009; Wagner 1987).

A challenge of chocolate as a military food arose with the invention of the handy chocolate bar in the nineteenth century. The ability of manufacturers to produce a shiny, relatively smooth, and certainly appealing stable bar of chocolate turned the basic product from a drink to a snack. The invention of milk chocolate by the century’s end came to almost define the everyday assumption of what “chocolate” was supposed to be.

But modern chocolate bars did not have the resilience of the ancient dried balls that soldiers grated to produce a palatable drink. Bars melted on a warm day or in a soldier’s pocket. A nearly unique quality of cocoa butter as a fat is its melting point of 86°–90°F (30°–32°C). This is just below typical body temperature (98.6°F, 37°C). Chocolate’s melting point and unique taste combine for a mouth feel shared by no other food.

Cocoa butter is solid at room temperature. But soldiers and explorers usually did not operate at room temperature and more often it was hot. Candy bars cannot be easily transported in soldier rations and cannot become a suitable emergency source of energy on the field when it is prone to turning into a sticky, murky, inedible liquid.

Arguably more than any other in the world the U.S. Army in the last century grew to love its chocolate rations. Hershey established a link with the U.S. military more than a century ago when it supplied chocolate to troops in World War I. However, the problem of the melting chocolate bar came under scrutiny in 1937. The army asked Hershey to create a stable chocolate-based food soldiers could carry as emergency field rations. Hershey’s answer was Field Ration D, a concoction that soldiers uniformly did not like and so treated it as the emergency ration it was supposed to be. It did, however, withstand temperatures up to 120°F and contained 600 calories. By 1945, one billion Ration D bars had been produced, and Hershey’s name became associated with patriotic Americana like baseball or apple pie (Brenner 1999).

Nestlé of Vevey, Switzerland, faced World War II marketing challenges in a neutral country that was increasingly isolated, and so it moved many of its executives to Stamford, Connecticut (Nestlé n.d.). While it is not today known as a high-temperature chocolate supplier to the U.S. Army, it did produce Field Ration D bars. An illustration of one such bar indicated the same ingredients as those of Hershey: chocolate, sugar, oat flour, milk, vanillin, and B1 (thiamin),

for 600 calories in 4 ounces. The bottom legend indicated “Prepared by Peter Cailler Kohler Swiss Chocolates Company, Inc., Fulton, N.Y.” (Farfaglia 2018, 145). In a history of the plant, author Jim Farfaglia wrote that company employees he interviewed said Nestlé actually came up with its own recipe. Nestlé documentation supported its involvement in developing Ration D bars, calling into question historians’ presumptions that Hershey was exclusively responsible for the product (Farfaglia 2018). Walter Baker, a U.S. chocolate maker dating to the 1700s, also produced military rations during World War II (Broekel 1985).

Nestlé’s as a dominant supplier of retail chocolate undertook a series of war-time advertisements under the theme “Chocolate Is a Fighting Food!” To explain why Nestlé chocolate bars for civilians may be in short supply, the advertisements pointed out that in addition to the familiar emergency Ration D, a chocolate bar was included as a dessert in Field Ration K, and cocoa powder for a beverage in Field Ration C. It further noted that cocoa was served to the military for breakfast and distributed “in large amounts” to soldiers through the USO and Red Cross. Company statistics indicated that half its production during the war years went to the military (Advertisement, *Saturday Evening Post*, November 6, 1943; Farfaglia 2018).

In 1941, rival Mars introduced a competitor to Hershey’s product, M&M’s Plain, that resisted melting within a candy coating. It also supplied troops during World War II. But the challenge of finding a chocolate that could both withstand high temperatures and still taste good required several more decades. At the military’s request, Hershey replaced its embarrassingly unpalatable Ration D with its Tropical Bar for troops in the Pacific—although soldiers reported it did not taste much better (Lewis 2015). But the name stuck: the goal in succeeding years was to formulate a bar of “tropicalized” milk chocolate that resisted high temperatures but still tasted reasonably like chocolate (Battelle Memorial Institute 1983). In 1988, Battelle laboratories in Geneva reported it had patented a milk chocolate that resisted melting to 95°–105°F (35°–40°C). It did so by manipulating an addition long known to harden chocolate: water. It added trace amounts with “unspecified surfactants” that it claimed did not change the taste or feeling of regular chocolate (Battelle Memorial Institute 1983; American Chemical Society 1988).

Large manufacturers showed little interest, at least publicly. Hershey responded it had been working on the same thing for years but could not find a tropicalized chocolate with a taste that met its standards. Other manufacturers showed more interest in the product (Gladwell 1988; Brenner 1999). The big firms, however, did show interest in coming up with their own formulations. In 1990, Hershey unveiled what at the time was considered a triumph. Its Desert Bar, introduced for soldiers in the U.S. Army’s 1990 Desert Storm operation in Iraq, was claimed to taste like a Hershey Bar but withstand temperatures of 140°F. It did turn to a putty-like consistency but did not melt. The formula added egg white, but exactly how was a trade secret. A Desert Bar giveaway to U.S. troops brought Hershey considerable publicity, although rival Mars also had its own heat-resistant product, M&M’s and Galaxy Block Chocolate, based on the Battelle formula (Brenner 1999; BBC

Documentary 2013). Hershey had just started production of the Desert Bar when the war ended. It sold the rest to the public as novelties, then discontinued production in 1991 (Hall 2016). In 2021, it was still sometimes available on eBay as a collectors' item.

The bar's soldiers' review perhaps did not live up to Hershey's stated standards, as in 2014 Hershey filed a patent for a new heat-stable chocolate that did not use water or emulsions. Two years before that Cadbury, a Mondeléz brand, also filed a patent for a tropicalized bar, and in 2013 Nestlé developed its own version (Nieburg 2014). In 2020, Mars announced a heat-resistant chocolate featuring polyol, a natural sugar replacement with a boiling point of 105°F (41°C). It combined this with another "thermal structuring component" made with sugar and packaged the chocolate for heat resistance. But as of early 2021 the bar, along with those patented by Cadbury and Hershey, was not yet on the market (Southey 2020; Mathers 2020).

Related to military use in the field is use of chocolate in explorations and expeditions. Teams of explorers as early as the 1700s included chocolate among their provisions. Alexander Henry in a 1776 exploration of Canada said chocolate kept up spirits of his men, even as other provisions dwindled; Pike's expedition of 1807 mentioned chocolate, as did Yukon expeditions of 1898 and Antarctic expeditions of the early twentieth century. Chocolate accompanied Theodore Roosevelt on his Brazilian expedition in 1904 and Apollo 15 astronauts to the moon in 1971. Edmund Hillary and Tenzing Norgay's conquest of Mount Everest in 1953 ended with Hillary leaving a commemorative cross at the summit. Norgay left a gift of chocolate (Grivetti and Shapiro 2009; Hershey Archives 2018; Werman 2013). A Nepali team on a difficult winter 2021 attempt to climb the world's second-highest mountain, K2, included in its rations 400 pounds of chocolate. The climb was successful (Skolnick and Sharma 2021).

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Milk Chocolate

Chocolate makers for centuries have favored a marriage of milk and chocolate. While pre-Columbian Mesoamerica did not have access to it, researchers have documented recipes from the 1600s for chocolate combined with cow's milk. Some of the earliest evidence comes from Jamaica, under British control after 1655. Following his visit to the island in 1687, English observer Hans Sloane found a lot to say about milk with chocolate. As physician to King George II, he purportedly found the local chocolate to be "nauseous" and so tried to temper its taste with milk. While milk does mask chocolate's naturally bitter flavor, an alternative argument suggests that in Jamaica Sloane observed chocolate's value in treating malnourishment, and so as a doctor he tried adding milk to enhance that benefit. The chocolate in 1600s Europe normally was prepared by adding to it an egg, sugar, and cinnamon in boiling water. Boiling milk could substitute. By the end of the century, Europe's coffee and chocolate houses would commonly offer the beverage

mixed with either water or milk, or both, as was the preference in London, with eggs to thicken (Garnsworthy 2010; Grivetti and Shapiro 2009; Loveman 2013).

By the turn of the seventeenth century, cookbooks generally featured chocolate recipes including chocolate cream and ice cream. A book of recipes from 1723 offered a recipe for “milk chocolate”: “Take a quart of milk chocolate without sugar, four ounces fine sugar as much; fine flour or starch half a quarter of an ounce, a little salt, mix them, dissolve them, and boil them as before.” Alternative recipes included chocolate with water and chocolate with wine. George Washington at Mount Vernon preferred a breakfast drink described as chocolate cream: chocolate mixed with hot water or milk, sugar, and sometimes brandy or wine (Nott 1723, 129; Jones n.d.; Mount Vernon n.d.).

All of these milk-based chocolate preparations—and some were mostly milk, little chocolate—had two disadvantages. One, they required fresh milk, often difficult to procure and easily spoiled in an age before refrigeration. Two, they required preparation as a beverage. But the year 1827 marked the beginning of the end for chocolate as almost exclusively a beverage. In that year, British chocolate manufacturer J. S. Fry & Sons introduced “eating chocolate” in bar form. Its popularity helped to propel the firm to become the world’s largest chocolate manufacturer by the mid-nineteenth century, as the convenient and cheaper bar swept away the fatty old beverages that had defined chocolate for generations. But as popular as the bar became, it had several drawbacks, one of which, at least for some, was its characteristic bitterness.

That disadvantage could be addressed by adding milk, recalling two centuries of European tradition. But milk is 88 percent water. It may be added for a drink but will not mix in a solid bar. And it soon spoils, turning sour any milk-based product. The answer would require two separate innovations by two men who found neighborly success in Vevey, Switzerland. Daniel Peter, born in Vevey, on Lake Geneva, in 1836, as an adult launched a candle-making business. Timing was off; Europe was moving to oil lamps by the 1860s. While he had no background in chocolate, he did have interest in the daughter of François-Louis Cailler, a Swiss chocolatier. His marriage to Fanny apparently did not end in formal collaboration with the Cailler firm, but it did pique his creativity. Peter’s dogged quest became what perhaps was the next holy grail of chocolatiers after bar chocolate’s invention: a bar of milk chocolate. For eight years, Peter worked concoctions of chocolate with dehydrated milk to prevent spoilage and overcome chocolate’s natural water resistance. Success came when a neighbor offered an idea (Candy Hall of Fame n.d.; Farfaglia 2018).

Henri Nestlé was born in Frankfurt, but settled in Vevey. As a pharmacist, he set to work on a formula to produce infant cereal that could supply nutrition to women unable or unwilling to breast feed. Nestlé proposed feeding Peter’s daughter his *farine lactée*, a sweetened flour and cow’s milk food for babies. Could Nestlé’s milk-based formulas become a basis for milk chocolate? Working with Nestlé’s products in 1876 Peter invented milk chocolate based on a procedure that removed the water from milk for a more stable product. This was sweetened condensed milk, according to the Nestlé official history, or milk powder, according to other sources (Pfiffner 2014; Candy Hall of Fame n.d.; Nestlé n.d.).

Nestlé, twenty-two years older than Peter, in 1875 at age sixty sold his infant formula business to local businessmen. While Peter introduced milk chocolate in 1876, his first commercially successful chocolate bar, Chocolate au Lait Gala Peter, debuted in 1887. “Gala” from the Greek means milk, spiritual nourishment, or abundance. Henri Nestlé died in 1890, and while he inspired the answer to the milk chocolate conundrum, Peter himself kept his chocolate business separate from the Nestlé company. Nestlé continued its focus on baby formula products.

Peter’s milk chocolate, containing almost no water, would not mildew or spoil, a triumph of chocolate manufacturing. His original bar did, however, taste a bit gritty. Another Swiss inventor addressed that problem in 1879 with the invention of conching (see **Conch, Conching**) (Nestlé n.d.; Garnsworthy 2010; Peter’s Chocolate n.d.; Grivetti and Shapiro 2009).

As a growing preference for milk chocolate greeted the century’s turn, British giant Cadbury in 1905 jumped on the market by developing its own Dairy Milk bar. It advertised a glass and a half of milk in every bar. Cadbury at the time was trying to compete with the new milk-based Swiss recipe that by 1911 represented half the world’s chocolate consumption (Mondeléz International n.d.; Cadbury 2010). Milk chocolate grew to become the standard of what the public thought chocolate should be. The old quest for high-quality cocoa beans became less important. Manufacturers instead considered the quality of the milk. Countries in West Africa that produced what some thought was inferior cocoa, but in higher quantities and better prices, grew to dominate world cocoa production (Macedo 2016).

Peter continued to market his milk chocolate bar, expanding in 1901 to Britain. That same year in the United States the Peter company gave Lamont, Corliss & Co. of New York rights to sell Peter chocolate. The agreement, according to Nestlé history, followed a visit by Thomas W. Lamont, who was so taken with the Swiss project that he made a deal to be its exclusive distributor in the United States and Canada (Day 1928). The company built on the growing fame of Swiss milk chocolate and a perception that the milk made it healthier. A 1905 Lamont, Corliss & Co. advertisement boasted, “Peter’s, the Original Swiss Milk Chocolate. Irresistibly Delicious and as Wholesome as Bread and Butter” (Peter’s Chocolate n.d.; Period Paper Historic Art 2021).

Two years later, Nestlé company reappeared into the milk chocolate story. Nestlé’s new factory in Fulton, New York, originally was designed to produce the company’s milk-based baby formula. But in 1904, Peter’s company, after merging with Swiss chocolate company Kohler, asked Nestlé for the opportunity to manufacture its milk chocolate out of the Fulton factory. The first bars rolled off its assembly line three years later. In 1909, Swiss chocolate manufacturer F. L. Cailler Co. joined Peter and Kohler to become the Peter Cailler Kohler Swiss Chocolates Co. Peter died in 1919 (Peter n.d.; Farfaglia 2018; *Fulton Patriot* 1951).

Peter Cailler Kohler (PCK) continued production under its own brands in Nestlé’s Fulton plant, although in 1929 the company was absorbed into the Nestlé corporation. Continued separate trademarks became confusing; wording in a World War II-era advertisement for workers at Fulton indicated it was sponsored by “Peter Cailler Kohler Swiss Chocolates Co., Inc., Fulton, N.Y.” But the chocolate bar illustrated was branded “Nestle’s” (Farfaglia 2018, 147). Lamont,

Corliss & Co. in fact was the same organization as PCK, Lamont as sales department and PCK as manufacturing department (Day 1928). Nestlé ended the confusion in 1951 when it dropped what the community had come to call the PCK brand, arguing “the sales of the products bearing the Nestlé’s name are now much larger than those sold under Peter, Cailler and Kohler brands.” A local news article at the time indicated that Lamont Corliss was the “parent organization” of PCK, but in the consolidation became Nestlé’s Chocolate Co. Nestlé from the beginning had financial interest in the New York distributor (*Fulton Patriot* 1951, 1; Nestlé 2003).

Separately from Peter, American confectioner Milton Hershey saw the potential of milk chocolate and hoped to establish his factory on a grand scale of mass production. Hershey, sometimes called the “Henry Ford of Chocolate” (Coe and Coe 1996), relied on a fortune he had made selling caramels to develop a milk chocolate bar that was then new to American tastes. His challenge, however, was the Swiss competition. Peter’s discovery at the century’s turn had become a famous trade secret known only to a few Swiss manufacturers. Undaunted, Hershey set out to discover for himself a formula for his own milk chocolate bar (see **Hershey’s Chocolate (USA)**). He introduced his 5-cent Hershey Bar in 1900, but he continued to perfect his milk chocolate method until 1905. Hershey’s milk chocolate did not taste quite the same as the Swiss formula. Some described it unapprovingly to be sweeter with a bit of sour milk undertone. Nevertheless, it grew to become the standard of milk chocolate for an American palate. By 1912, the Swiss milk chocolate method was no longer a secret, and by 1930 milk chocolate dominated the chocolate market in Europe and North America (Brenner 1999; Grivetti and Shapiro 2009).

In 2021, the iconic milk chocolate Hershey Bar remained in the retail market, but Peter’s bar did not. The brand was acquired by multinational food giant Cargill in 2002. In 2021, Cargill continued to produce chocolate based on Peter’s original recipe for whole milk “crumb.” The term referred to Peter’s method of dissolving sugar in milk, evaporating the water for condensed milk, adding cocoa, and drying the substance for later use. It could be reconstituted into milk chocolate (Peter’s Chocolate n.d.; Garnsworthy 2010). Peter brand chocolate in 2021 was available to bakeries and chocolatiers but was no longer sold in bar form to retail markets. Peter invented the world’s favorite kind of chocolate. But today his name among chocolate lovers has fallen into obscurity. Nestlé in 2021 still produced chocolate in Europe under the Cailler brand. A Kohler brand chocolate in 2021 was produced in Kohler, Wisconsin, but apparently not connected to the original Swiss brand.

Chocolate ingredients and labeling have long been tightly regulated in both North America and Europe. In the United States, milk chocolate must contain no less than 10 percent chocolate liquor (also called chocolate mass) by weight, not less than 3.39 percent milk fat, and not less than 12 percent total milk solids (FDA 2019). In Europe, EU regulations require milk chocolate to contain at least 25 percent “dry cocoa solids” and at least 14 percent “dry milk solids” (EU Directive 2000/35/EC, 2000). High-quality milk chocolate often contains far more than minimum chocolate mass, up to 45 percent. Usually the chocolate replaces sugar for a less sweet product (Gordon 2007).

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Molinillo, Molinet

For most of its history, chocolate was nearly always consumed as a water-based beverage. It began as a paste-like cake formed through a laborious process of gathering the cacao seeds from the pods, fermenting, roasting, winnowing, and grinding. To prepare chocolate, the cake would normally be placed in water and, usually with the addition of spices or sweeteners, dissolved and often heated. Because chocolate is about 50 percent fat, called cocoa butter, the cake did not mix easily with water. For centuries before colonization, Native Americans of Mesoamerica vigorously poured the beverage between containers both to mix ingredients and to bring up froth. A frothy *jicara* (decorated gourd cup) of cocoa was particularly esteemed among Aztecs and Maya as part of an elaborate cocoa-serving ceremony to impress guests with a beverage held in high regard (Maya at Mexicolore n.d.; Valdez et al. 2002).

The first Europeans who reached the New World did not immediately see the benefit of the brownish froth on the beverage. Jesuit José de Acosta in an early text compared it to, well, an unpleasant product of human elimination, a “scum-like bubbling” (Norton 2006; Coe and Coe 1996). But Europeans soon came around, and by the end of the 1500s, apparently agreed that not only did the froth make the drink more pleasant, the frothing exercise helped to minimize a slick of unappealing cocoa butter from floating on the surface.



For most of its existence chocolate was consumed as a beverage. Because it is about 50% fat (called cocoa butter) it does not easily mix with water. The Spanish invented a whisk, called a molinillo, to keep the solids suspended and bring up a froth. Ornate chocolate pots with a hole in the lid for the stick appeared on European tables by the late 1600s. These became obsolete as manufacturing techniques changed in the 1800s. (The Metropolitan Museum of Art)

Europeans abandoned the native pouring ritual by repurposing possibly a pestle or yarn needle as a stick-based frother (Norton 2006). By adding a roughly carved pattern to the end of the wood stick, *molinillo* in Spanish, *molinet* in French, a chocolate maker could twirl the tool between hands to whip up chocolate foam and help mix the fat and cocoa particles. Apparently, this large swizzle stick was even favored in the New World by 1570, because physician and botanist Francisco Hernández, who lived in New Spain from 1570 to 1577, described natives using a “wooden pestle” to mix the cocoa (Chabrán 2015). English Dominican friar Thomas Gage, whose 1648 *A New Survey of the West-Indies* helped introduce cocoa to London, observed the stick could be used for a variety of things, “but the chief ingredient (without which it cannot be made) is called cacao, a kind of nut or kernel bigger than a great almond, which grows upon a tree called the tree of cacao.” Gage wrote that the word *chocolate* came from use of the *molinillo*: “from the sound which the water (wherein is put the chocolatte) makes as choco, choco, choco” (Gage [1648] 1677, 238). Physician William Hughes apparently borrowed from Gage (though he does not give credit) noting, “This drink called Chocolate, taketh its name, as some think, from the sound which is made by stirring it in the Pot with the *Molinet* or Chocolate-stick in making of it” (Hughes 1672, 115). Recent research, however, has discounted the story, noting no pre-Columbian reference to chocolate preparation included a *molinillo* (Coe and Coe 1996).

The *molinillo* became part of the standard European equipment as chocolate’s popularity burgeoned by the latter half of the seventeenth century. Chocolate pots with a hole in the top for the *molinillo* began with simple clay pots, the *jícara* and the *tecomate* (clay cup) often portrayed in Spanish paintings of the 1600s featuring chocolate (Norton 2006). Nicolas de Blégny, physician to Louis XIV in France, in 1687 wrote extensively on cocoa customs of Paris, including his own design for a chocolate pot. It was identical to a coffee pot with the addition of a hole in the center for the *molinet* (De Blégny 1687; Jones 2013). The silver chocolate pot, or *chocolatière*, was apparently introduced by the French (Grivetti and Shapiro 2009).

Coenraad van Houten’s press and alkali treatment (Dutch process) in 1828 eliminated the need for vigorous mixing. The chocolate pot and *molinillo* became obsolete. Elaborately turned *molinillos* are still commonly available in the markets of Central America, however, where the old process sometimes still finds favor. The traditional frother also can be taken to milk and chocolate heated in a pan on a stove to whip up a modest froth.

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N

Nacional Chocolate

Specific classifications of cacao tree variety (*Theobroma cacao*) originated soon after the Spanish conquest of the New World in the early 1500s. Two simple designations, forastero and criollo, became the basis for centuries of cacao farming, though by the nineteenth century agricultural researchers knew these were inaccurate and incomplete (see essay on **Natural History of Cacao**). Modern genetic research finally sorted out the confusion of varieties by proposing ten genetic clusters in the cacao germplasm. One of these was Nacional (Motamayor et al. 2008). The presumption, however, was that this ancient cacao variety was extinct, represented only by Nacional hybrids.

Nacional cacao originated in Ecuador. Archaeological research has determined that the cacao tree did not come from Central America, as was presumed for centuries, but from South America. Archeologist Francisco Valdez working in Ecuador's southern Amazonian region of Amora Chinchipe in the early 2000s discovered traces of theobromine and caffeine, markers for cacao, in ceramic containers. The containers were determined to be about 5,300 years old. It is unknown how ancient natives consumed cacao, but the variety they consumed was likely what later explorers called Nacional (Frydenborg 2015; Toth n.d.; Caselli 2013).

Imported cocoa to Europe from Ecuador in the beginning of the 1600s began to replace the dwindling supply from Guatemala and southern Mexico. Ecuador's production centered on the port of Guayaquil (Norton 2006). By the turn of the nineteenth century, Ecuadorian chocolate was flooding the European market, called "Guayaquil" after the city of export. But European dealers considered it inferior in quality. A second Ecuador export of better quality also was produced, called Esmeralda, a cross of criollo and Nacional. A third variety, also a Nacional type, was called Arriba. It was considered a variety of forastero, now a catch-all term for several cacao varieties (Presilla 2009; Squicciarini and Swinnen 2016; Coe and Coe 1996).

By the early twentieth century, Ecuador had grown to become the world's largest exporter of cocoa. But in a story repeated many times throughout the history of cacao cultivation, Ecuador's cacao farmers in 1916 faced disaster after disease swept through their cacao plantations. Three years later, 95 percent of their Nacional cacao trees were dead. Farmers tried hybrid seeds in an effort to replace Nacional with more resistant strains, but attempts failed, and they moved to producing more lucrative bananas and coffee (Toth 2018; Caselli 2013; Institute of Culinary Education 2010). By the early years of the twenty-first century, most geneticists presumed the ancient variety, pure Nacional, was extinct.

In 2007, Chicago investment banker Dan W. Pearson and business partner Brian Horsley were roaming in the Andes mountains of Peru searching for fruit to supply their mining equipment operation. In the Marañón Canyon, Pearson noticed unusual wild cacao trees growing at a normally unheard-of altitude of 3,500–4,100 feet. Also unusual, the pods opened to peculiar seeds: about 40 percent were white. Curious, Pearson sent leaves from the trees to the U.S. Department of Agriculture's Agricultural Research Center for genetic analysis. In 2009, USDA researcher Lyndel Meinhardt called Pearson with an exciting result: the sample was pure Nacional. "The international cacao database has 5,300 entries," explained Meinhardt. "None are pure Nacional with white beans. Cacao pods with 40% and 100% white Pure Nacional beans are an unprecedented discovery" (Marañón Chocolate n.d.-a.; Institute of Culinary Education 2010).

It was not the last discovery of pure Nacional. While the ancient variety now had been rediscovered in Peru, archeologists believed its original cultivation may have been in Ecuador. And it was Ecuador that became the powerhouse of Nacional cocoa production a century earlier. Chicagoan Jerry Toth in 2009 presumed as did the experts that Ecuador's pure Nacional was extinct. However, he was introduced to unusual cacao trees growing in Piedra de Plata, Manabí province, Ecuador. With help from Freddy Amores, an Ecuadorian scientist of cacao research, Toth submitted to the USDA samples from forty-seven of the cacao trees for DNA analysis. Meinhardt and researcher Dapeng Zhang in 2015 returned the result: nine trees were pure Nacional. Another thirty-one were at least 70 percent Nacional (Toth 2018).

Both Toth and Pearson launched fine-chocolate operations to reintroduce what had by 2021 become the rarest—and most expensive—chocolate in the world. Pearson and Horsley paired up with a Swiss company as Marañón Chocolate. Its couverture was branded Fortunato No. 4, prepared using a traditional Swiss conch from 1879 that the company argued produced more delicate flavor. The chocolate was marketed to bakers and chocolatiers but was not available in consumer-sized bar form (Marañón Chocolate n.d.-a).

Toth, with business partners Carl Schweizer, from Austria, and Schweizer's wife Dennise Valencia, from Ecuador, established a bean-to-bar operation in Ecuador itself. Cocoa beans normally are shipped for processing elsewhere, but in Toth's case it was almost a farm-to-bar operation, as the operators lived and worked with the producers of the unusual bean (Fredenburgh 2019). The company, To'ak Chocolate, featured ultra-high-end Nacional presented in its own wooden box. Also offered were specialty recipes including cask-aged bars.

Another variety of chocolate from Ecuador, Arriba, has been promoted as Nacional, often called Arriba-Nacional (Callebaut n.d.). Arriba, a traditional name for Ecuadorian chocolate, is Spanish for up or above. It referred to the chocolate produced above or to the north of Guayaquil (Christian n.d.). It is, therefore, a region, not a chocolate variety. But by 2021 some chocolate companies were pairing the names to identify the fine chocolate they offered (Toth n.d.; Caselli 2013). Confectionary giant Nestlé in 2014 invested \$16 million in Guayaquil based on

Arriba beans, designated as “fine flavor” by the International Cocoa Organization (ICCO) (Nestlé 2014; Harrison-Dunn 2014).

Toth in 2019 compared Ecuador’s chocolate produced in the Arriba region to “the Burgundy of the chocolate world,” defined by the boundaries of the Daule and Babahoyo river watersheds (Toth 2018; Fredenburgh 2019). A further comparison of fine chocolate to fine wine classification in this case may help explain Arriba-Nacional; Burgundy’s wine producers may raise the prestige of their vineyard by combining the area in which it is produced with the name of the region’s grand cru. For example, Aloxe-Corton is wine produced around the town, but Le Corton is the grand cru. Chocolate writers have observed that Arriba-Nacional merely meant Ecuador’s national chocolate grown in the region north of Guayaquil, “simply an exotic trade name and neither designates a genotype nor even a well-defined geographic area anymore” (Christian n.d.). While this chocolate in 2021 was offered at a lower price, companies that featured it pointed out that Arriba-Nacional has been recategorized as its own genetic type, and as it is grown only in this region of Ecuador, classified as single origin (Conexión Chocolate Ecuador n.d.).

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Nestlé S.A. (Switzerland)

Nestlé, the Switzerland-based food giant, was at the beginning of its corporate life not a chocolate company. In 2021, it was again not a chocolate company—or at least appeared to be moving in that direction. Nevertheless, in 2020, the International Cocoa Organization ranked Nestlé as the world's sixth largest chocolate manufacturer, with \$7.636 billion in sales (Candy Industry 2021).

The irony seems to be that while Henri Nestlé in 1867 was interested in promoting a milk-based baby formula that had nothing to do with chocolate, his company kept running into chocolate producers. The company's founder advised his first chocolate maker around 1875. Daniel Peter was a younger neighbor of Nestlé's in Vevey, Switzerland. Nestlé had already become a rich man in the food business. He began by selling mineral water, carbonated lemonade, mustard powder, vinegar, and other foods, a tradition of variety that the company has extended to the thousands of products it produced in 2021 (Pfiffner 2014). But Henri Nestlé gave up some of his early products, notably mineral water because of poor sales. He expanded into a range of other products and services that seemed to have more potential. In the 1860s, Nestlé considered the challenge of high infant mortality in Europe with concern about the possibility of addressing those women who could not or would not breastfeed for a variety of reasons. Substitutions often were unhygienic or not nutritious. Nestlé considered the science of the time as background for his work toward developing an infant formula that addressed what appeared to be a need in European culture in which breastfeeding was not common (Pfiffner 2014). It was an unusual choice, as Nestlé had no background in infant nutrition. But his late marriage and ensuing family circumstances encouraged him to consider developing a better infant food. He paired the idea of using Swiss cow's milk, with its excellent reputation, and scientific findings to produce in 1867 an infant formula containing what he promoted as featuring the best nutritional standards of the time.

The formula was not revolutionary, mostly milk and flour, yet his version became an immediate success. Nestlé's aggressive marketing expanded reach of the product, but as continued growth would require more capital, Nestlé instead chose in 1875 to sell the business and retire a rich man at age sixty. He even signed away the use of his name for the company to three Swiss businessmen as a joint

stock company. To avoid confusion, Nestlé promised to change his name to Nestlé-Ehman. He continued in retirement to encourage charitable and civic efforts and to make small loans to those in need (Piffner 2014).

Nestlé's "milk food" as a nutritious formula for both infants and aged began as a fine yellow powder with dried milk, sugar, and wheat flour. It had nothing to do with chocolate until Peter had an idea. Apparently, Nestlé at some point suggested to Peter, who was trying to invent a successful formula for milk chocolate, that milk powder (or possibly condensed milk or condensed milk powder—sources conflict) could work as a substitute to the liquid milk that spoiled or would not mix. It worked. But despite presumptions that Nestlé and Peter went into business together, it is likely that Peter was one of many young entrepreneurs whom the retired Swiss tycoon encouraged, perhaps with a small loan. No evidence indicates the two were formally in business together. Nestlé's company had already been sold in 1876, when Peter unveiled his first milk chocolate bar (Peter n.d.).

Henri Nestlé died in 1890. The company operating under his name continued to expand its most successful product line, infant formula. In 1898, Samuel Grande landed in the United States with a Nestlé charge of building and operating its first U.S. plant to manufacture infant formula. The company settled on a plot in Fulton, New York, as it was close to East Coast shipping as well as dairy farming (Nestlé 2003). The Fulton plant was already manufacturing formula, cheese, and condensed milk when in 1904 a Swiss company producing Peter's milk chocolate requested space to build its production in the United States (Farfaglia 2018). What happened from then on requires close reading, as several companies were involved: Peter, Cailler, and Kohler headquartered in Switzerland; Nestlé, also headquartered in Switzerland; and Lamont Corliss & Co., headquartered in New York.

Perhaps the easiest way to understand the relationship among these seemingly separate operations over the next half century is to begin with this: they were actually all one company. Lamont Corliss marketed Peter chocolate, after business merges becoming Peter Kohler chocolate, and then Peter Cailler Kohler Swiss Chocolate (PCK). In 1911, Nestlé acquired 29 percent interest in PCK, and in 1909, Lamont Corliss acquired the Fulton plant to market chocolate under the Peter, Cailler, and Kohler brands. The Fulton plant moved solely to chocolate manufacturing in 1924, shifting its infant formula production to Ohio (Farfaglia 2021).

Lamont Corliss was partly owned by Nestlé from the beginning of its association with PCK. The New York marketing firm had become in effect the parent company of PCK chocolate. In 1951, it was absorbed into the Nestlé corporation. Nestlé in effect controlled PCK throughout its association with the Fulton plant, even though its chocolate was sold under the three separate brands. Under the Nestlé name in Fulton, however, Lamont Corliss also developed chocolate products, most famously Nestlé's Crunch Bar in 1938, but also Toll House Morsels (1939), Nestlé's Milk Chocolate (1935), Nestlé's Milk Chocolate with Almonds (1935), and Nestlé's Quik (1950; called NesQuik in Europe) (Fulton Patriot 1951; Farfaglia 2021; Justia Trademarks 2021).

The Toll House semisweet chocolate chips took advantage of Ruth Wakefield's invention of the chocolate chip cookie at her Toll House restaurant in

Massachusetts. The company negotiated with Wakefield to publish her recipe on its bags in return for a free lifetime supply (Nestlé USA 2013; Farfaglia 2018; Nestlé 2014). Nestlé in 1936 also developed a new confection made without cocoa solids, comprising cocoa butter, milk, and sugar, that it called white chocolate. Disagreement regarding whether this product was actually “chocolate” led the U.S. Food and Drug Administration to rule it must be called a confectionary, though the rule was rescinded in 2002 (Wida 2019; Beckett 2000; Szalay 2018; Nestlé n.d.-a).

Brand confusion became so evident that in 1928 the vice president of Peter Cailler Kohler Swiss Chocolate Co., which was in fact owned by Lamont Corliss, which was in fact partly owned by Nestlé, believed it necessary to explain to Fulton workers in its corporate newsletter. “Lamont Corliss & Co and Peter Cailler Kohler are really one and the same organization,” he wrote (Day 1928). Nestlé absorbed PKC into its corporate structure in 1929, but continued to produce the separate brands. A World War II depiction of the military Field Ration D bar was signed “Peter Cailler Kohler Swiss Chocolate Company,” but the bar illustrated was confusingly branded “Nestlé’s” (Farfaglia 2018, illustration, 147). Nestlé ended that confusion in 1951 by pulling all its chocolate brands, as well as Lamont Corliss, under the Nestlé name.

Nestlé’s chocolate brands grew in the United States following a widespread wartime advertising campaign. In 1940, it launched its “Chocolate Is a Fighting Food” slogan to both promote its products for military use and to explain why its domestic production had fallen. Copy from a 1940 poster suggested, “Delicious, nutritious and compact—chocolate is everybody’s favorite, whether on the fighting front as an energy food, or on the home front as a quick pick-me-up” (Nestlé advertisement). After the war, Nestlé continued to strongly promote its U.S. chocolate brands and to expand its confectionary products. In the 1980s, Nestlé set a record by producing the world’s largest chocolate bar, a 7,000-pound Nestlé’s Crunch (Nestlé USA 2013). In 1990, it purchased iconic U.S. chocolate bar brands Butterfinger and Baby Ruth. To late twentieth-century America, Nestlé meant chocolate, its advertising slogan and ubiquitous chocolate-based products becoming part of most American homes.

But worldwide the Swiss-based food company had never been primarily about chocolate. Among its hundreds of familiar brands was a strong link to its original product: infant formula. And it was this product that in the 1970s made Nestlé the target of one of the most famous world boycott campaigns in history.

Nestlé by the twentieth century had become the world’s dominant maker of infant formula, supplying 40 percent of the world market. It began to extend this business into newly developing countries, particularly in Africa, by launching an ambitious marketing campaign in favor of its formula based on nutritional science. Critics contended, however, that the campaign led women to substitute Nestlé formula for their own breastfeeding in countries where illiteracy was high, sanitary conditions were low, and refrigeration was inconsistent. Formula misuse caused serious illness and dietary deficiencies, the critics charged, accusing Nestlé, in particular, of unethically promoting its formula by encouraging doctors with free samples. In 1977, a Nestlé boycott beginning in Minneapolis,

Minnesota, eventually spread to ten countries. Press coverage turned brutal, articles sometimes published under lurid headlines such as “Nestlé Kills Babies.” While Nestlé won a libel suit in Bern, Switzerland, the boycott continued to attract joiners. Nestlé’s apparent refusal to adequately respond to the criticism put the multinational on a path to a reputation it still held among some groups in 2021 as “the most hated company in the world” (*New York Times* 1984; Global Nonviolent Action Database n.d.; Andrei 2021).

In 1984, Nestlé agreed to stop what its detractors believed were predatory marketing practices in developing countries and to include on its packaging warnings of hazards of feeding formula. The Infant Formula Action Coalition, a boycott group organized against Nestlé, accepted the deal and suspended the boycott (*New York Times* 1984). But Nestlé’s public image problem had not ended, as some critics continued to claim it was not honoring its promises. In 2018, Nestlé defended itself against critics who said it was not following a World Health Organization 1981 advertising code banning promotion of infant formula as comparable to breastfeeding. Nestlé responded that it did follow the code and emphasized that its formula was made with high quality, science-based ingredients (Neslen 2018).

However, criticism of Nestlé grew beyond its infant formula, notably to its chocolate. In 2015, the British Advertising Standards Authority upheld a complaint of a group calling itself the Children’s Food Campaign, alleging that the food giant promoted its high-sugar Nesquik as healthy. Nestlé’s advertising claim, that Nesquik was a “great start to the day” encouraged poor child health habits, critics said. Nestlé dropped the campaign (Gallagher 2015). Nestlé also has been among most of the large confection manufacturers accused of buying chocolate from African producers that used slave labor or child labor (Lawrance and Roberts 2019). Nestlé, also in common with major producers, has responded by making a commitment to sustainable development and putting an end to poverty and child labor in the cocoa sector (Nestlé n.d.-c).

But what attracted most cocoa industry notice was Nestlé’s dramatic decision in the early twenty-first century to essentially leave the retail chocolate business in the United States. In 2018, Nestlé sold nearly its entire confectionary business, including all of its candy bar brands, to Italy-based Ferrero-Rocher for \$2.8 billion (Terry 2018). The sale even included its most famous bar, Nestlé’s Crunch, which became simply Crunch bar.

Some employees of the Fulton plant reported they saw this coming years before. Corporate headquarters moved some chocolate production away from Fulton and, in the 1990s, moved Crunch bar production to Brazil. Production quality issues (the Crunch lost its crunch) encouraged a move back to the United States, but not to Fulton. In 2002, Nestlé announced that its enormous but aging Fulton operation was closing. Final buildings were razed on its twenty-four-acre site in 2016 (Farfaglia 2018).

In 2021, Nestlé continued to sell hundreds of familiar food brands in the United States and the rest of the world, including thirteen common pet food brands. But for chocolate all that was left on the shelves of American grocery stores were After Eight mints, Toll House Morsels, and Nestlé’s Quik.

Nestlé's chocolate retreat was not, however, as pronounced in Europe. In fact, Nestlé acquired York-based Rowntree in 1988 and with it several iconic brands. The acquisition was hostile, angering the public as the storied company had been British for more than a century. Nestlé embarked on a bidding battle against Jacob Suchard, the Swiss-German confectioner that had already acquired Belgium's Côte D'Or and Netherland's Van Houten. After the British government declined to intervene, Rowntree shareholders voted for Nestlé's offer of \$4.55 billion, and the famed York-based British chocolate company fell to foreign ownership. Suchard itself, maker of Toblerone, was acquired by U.S.-based Kraft Foods, later to become Mondeléz (Cadbury 2010).

Rowntree introduced KitKat in 1935, originally called Chocolate Crisp. Also that year it introduced Aero (Cadbury 2010). After the acquisition, Nestlé continued to sell Aero in Britain. In Europe, it retained the Cailler brand. By 2014, like many large manufacturers, Nestlé hoped to capitalize on growing interest in fine flavor chocolate by launching *Les Recettes de L'Atelier* (Nestlé n.d.-b). And worldwide it marketed KitKat candy bars, although not in the United States, where the brand was sold by Hershey.

Nestlé's move after a century to in effect eliminate many of its mass-market chocolate brands began with a conscious corporate decision to rework its image into a company that cared about healthier foods. In a biography of Henri Nestlé, Pfiffner (2014) reported that Helmut Maucher, who became Nestlé CEO in 1980, veered more intensively to the company's legacy as research-based producer of healthy foods. The move continued in 1997 when his successor, Peter Braback-Letmathe, introduced the Nutrition Strategic Business Division to establish new products. Three years later Braback-Letmathe announced that Nestlé would transform itself from a traditional manufacturer of food products to a "research-driven food, nutrition and wellness company." He created a corporate wellness unit and replaced "food" with "health," becoming a "nutrition, health and wellness company" (Pfiffner 2014, 12).

The move led Nestlé to divest itself of brands that did not meet the new standard, including U.S. candy bars such as Butterfinger and Baby Ruth that not only were deemed less healthy but also were losing market share (Yu 2018). Nestlé acquired Gerber baby food in 2006 and Novartis Medical Nutrition in 2007. In 2012, it acquired the infant formula business of Pfizer (Pfiffner 2014).

Nestlé in 2021 owned more than two thousand brands sold in more than 150 countries. One of its leading divisions reached back to the very beginnings of Henri Nestlé's firm before he found success with infant formula: bottled mineral water. In 2021, Nestlé marketed it worldwide under sixty-eight brands, including familiar brands such as in the United States Poland Spring, Ice Mountain, and Nestlé Pure Life, and in France Contrex and Vittel (Jewell 2016; Nestlé n.d.-b). Some of its more familiar worldwide chocolate brands included KitKat (sold by Hershey in the United States), Aero, After Eight, Big Turk, Black Magic, Cailler, Galak/Milky Bar, Alpine White, Nestlé's Milk Chocolate, Perugina, Quality Street, Rolo (sold by Hershey in the United States), Walnut Whip, Wonka Bar, and Yorkie.

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Nibs

About twenty to forty seeds of the cacao tree can be extracted from their mucilaginous home in each cacao pod. While the white pulp surrounding them is sweet and immediately palatable, the seeds appear as edible as watermelon seeds—that is, not very. The unique taste of cocoa relies on a series of steps that turn this bitter seed into the world’s most storied confection.

Cacao seeds ferment quickly under the tropical heat in which they are grown, the pulp becoming liquid that drains away, although some producers recently have tried to market it separately (Southey 2021). Like kombucha or kimchi, fermentation is required to develop the familiar cocoa flavor. Yeast produces alcohol in the sweet pulp. Then oxygen-loving bacteria take over to produce acetic acid (main component of vinegar), causing changes in the seed that kill the sprout and produce peptides that offer the familiar chocolate aroma during roasting (Clark 2021).

Fermentation may last from one day to nearly a week, depending on cacao variety and producer preference. After fermentation, the beans are dried and from there normally shipped to a processor for roasting. Roasting traditionally has been undertaken far from the beans’ country of origin, although some roasting and grinding operations have been established in Africa’s main cocoa-producing countries of Ivory Coast and Ghana.

The roasting process leaves a crinkly shell that can be winnowed, and a dry bean that easily cracks into pieces. It is those pieces that we call nibs.

The English “nib” from the 1600s was the point of a quill pen. Its use as a reference to cocoa bean fragments is fairly recent in chocolate history; the *Oxford English Dictionary*’s earliest reference is 1842. The French call the fragments, logically, *éclats*, meaning fragments or splinters. But Spanish usage, *puntas*, meaning tips, most likely is the origin of the English word; *punta de lápiz* is a pen nib.

As nibs go, however, cocoa beans are unusual for reasons beyond their apparent unpalatability direct from the pod. The friable bean after roasting can be easily broken into pieces by hand, unlike coffee beans. And while grinding coffee will produce a powder, grinding cocoa nibs will produce a paste. As pure cocoa, the nibs comprise about half fat, called cocoa butter. The fat is unique because it is solid at room temperature, but melts at slightly under body temperature. This gives chocolate one of its great attractions: it melts on the tongue.

A processing challenge with nibs, however, is the gritty texture in their natural form. Nibs may be small, but to make them small enough for chocolate they must be ground as fine as possible. The original stone *metates* used to grind cocoa beans in Mesoamerica and Europe could be heated as the worker labored to turn nibs into the finest-ground chocolate possible by hand. But a slightly gritty mouth-feel could not be removed.

Today’s mechanical grinders easily reduce nibs to the size it takes to produce a silky chocolate, less than 30 microns. Some melangeurs available to serious hobbyists will reduce the nibs to 10–20 microns (Beckett 2000; Nanci 2016).

The nibs, ground into 100 percent pure chocolate liquor (also called chocolate mass), comprise only two ingredients, cocoa solids and cocoa butter. Purist and pastry chefs may find it appealing, but most chocolate fans need at least one

addition: sugar. Other additions may include, most commonly, dried or condensed milk and vanilla.

Nibs for most of chocolate's history were not eaten unprocessed, but that has changed as modern research has discovered possible health benefits. Recent research has called into question our hopes that chocolate could be a health food, but at the least we know the nibs will add minerals and fiber. Crunchy nibs have become popular additions to chocolate bars, cookies, brownies, hot cereals, granola, ice cream toppings, salad sprinkles, and smoothies.

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Olmeecs

See Maya, Mayans

P

Pandemic of 2020–2022

It is easy to imagine that the greatest world health crisis in a century would have an impact on chocolate producers and manufacturers. That was true, but the impact was not always negative. The chocolate manufacturing industry is resistant to economic turmoil. That is, in good times and in bad consumers will not give up their chocolate. But the consequences of a worldwide pandemic forced the industry to face a crisis different from any economic disruption of the past.

Nearly everyone realized by March 2020 that a new and deadly virus was sweeping the world and that authorities needed to respond quickly and aggressively. Governments in most countries imposed lockdowns. Requirements varied, but generally they asked citizens to avoid leaving their homes, to avoid crowds or groups of people, and to wear masks when venturing out. Nonessential businesses were closed. Nearly all international travel, and much travel within countries, fell to nearly zero. International exports were disrupted, and manufacturing stopped as industries closed factories to protect workers.

The cocoa sector in the early days of the pandemic, spring and summer 2020, saw much of its business topple with the rest of the world economy. From the supply perspective, cocoa prices declined as demand weakened. Grinding operations dropped 10 percent, farmers in the major producing countries struggled to sell their beans, and a surplus of cocoa reduced commodity prices to below \$2,000 per metric ton (about 2,205 U.S. lb.) by summer. It stood at \$2,716 in February 2020 (Myers 2021b; GhanaWeb 2020; Statista 2021). By January 2021, a new pandemic wave slowed global cocoa demand to the extent that 100,000 tons of unshipped beans filled the warehouses in Ivory Coast, whose one million smallholding farmers are the world's largest supplier of cocoa (Aboa 2021). The world's second largest supplier, Ghana, in 2020 reported its steepest drop in demand in a decade, blamed on the pandemic (GhanaWeb 2020).

The pandemic hit the top African cocoa-producing countries at an unfortunate time. Ivory Coast and Ghana governments planned in October 2020 to implement a \$400 per ton Living Income Differential (LID) to help impoverished farmers obtain a reasonable return for their cocoa. The industry generally supported the move, but when the pandemic disrupted supply chains and demand, some exporters privately said the LID rollout should have been delayed, as it contributed to the surplus. Manufacturers facing pandemic-related costs were able to buy cheaper cocoa from countries such as Nigeria and Ecuador that did not participate in the LID plan. In March 2021, Ivory Coast discounted its cocoa premium about \$100–\$200 to move its stock but unsold beans still remained in warehouses there (Aboa 2021).

Worldwide cocoa demand slumped not because consumers wanted to eat less chocolate but because they had fewer options to buy it. As travel came to a near standstill for much of 2020, the impulse buy of chocolate at train stations, airports, and service stations took a hard fall. Chocolatiers produced nothing as restaurants closed or dramatically reduced capacity (GAFSP 2021). Tourism and get-togethers all but vanished and with them demand for gift chocolate.

The Swiss chocolate industry, in particular, took a pounding as tourism dropped to nothing. Chocosuisse, the national federation of Swiss chocolate makers, reported a forty-year pandemic low in chocolate consumption. Swiss chocolate, in particular, appealed to tourists in the home country as well as gift sales at transportation hubs. Its exports fell 11.5 percent in 2020 (Business Inquirer 2021).

Not all manufacturers faced pandemic-based losses. In fact, for some the pandemic actually boosted the bottom line. Manufacturers whose sales relied mostly on grocery stores saw gains as consumers forced to stay home stocked up. Hershey, the world's fifth largest chocolate manufacturer and a dominant U.S. chocolate brand, saw its sales climb 16.6 percent, despite losses from closed airport shops and movie theater concession stands. In 2020, Hershey sold nearly one billion pounds of chocolate and 1.5 billion candy bars. The world's largest and second-largest chocolate manufacturers, Mars Wrigley and Ferrero Rocher, also sold more of its chocolate products during the pandemic. Olam Cocoa head of ingredient development and innovation Wouter Stomph said 2020 became a "year of nostalgia," as worried consumers returned to familiar favorite chocolate tastes rather than venturing to "adventurous, new flavor combinations" (Myers 2021a).

Generally, in the United States, pandemic chocolate sales grew 4.2 percent, with a 10.5 percent growth in grocery store sales, and a whopping 76.5 percent growth in online sales. Nestlé, on the other hand, lost 12 percent in its confectionary division, offset by gains in other divisions. One big loser among the larger operators was the World's Finest Chocolate in Chicago. Its niche was providing products that children sold for school fundraisers. When the pandemic closed the schools, its income dropped from \$160 million in 2019 to \$100 million in 2020 (National Confectioners Association 2021; Scully 2021).

Some smaller makers also saw gains, as the U.S.-based National Confectioners Association reported a 12.5 percent increase in premium chocolate consumption during the pandemic (Dishman 2021). Many small manufacturers launched aggressive e-marketing campaigns in an attempt to capture burgeoning online pandemic-driven sales (Myers 2021a; Scully 2021).

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Pepys, Samuel

Historians have limited documentation of chocolate's European introduction and rise before the end of the 1600s. They rely on a few important texts, notably those by Nicholas de Blégny, Antonio Colmenero de Ledesma, Thomas Gage, and Henry Stubbe. These wrote books that described chocolate from a medical perspective. Even more rare are works that describe it from a social perspective. The diary of Samuel Pepys is an exception that gives us insight into the early development of a chocolate boom in London.

Pepys was born in London in 1633, son of a tailor. While of modest background, family members helped him establish a career through government connections. Pepys rose to chief secretary to the admiralty during the reigns of King Charles II and James II. This gave him an opportunity to move among the wealthy and aristocrats of English Restoration society and to become himself a man of reasonably secure means. He could indulge in some of the new and exotic beverages that had only recently arrived in Europe: coffee, tea, and, most expensive, chocolate.

Pepys kept a diary for about a decade, recording in it details of his daily activities, occasional gossip, and historical events including the London Great Plague (1665) and Great Fire (1666). He also wrote frankly of his personal life, often of struggles with what he called the "debauchery" of too much strong drink (Pepys [1660–1669] 1893, *passim*). It is in that struggle that Pepys tells readers about his introduction to chocolate, some of the earliest references we have to what by the 1690s became a chocolate craze (Reynolds 2019).

During their early period, the three new exotic beverages were ostensibly presumed to be medications. Coffee houses were already established in London by the time Pepys began his journal in 1660, but chocolate probably was a recent addition. The first documented instance of chocolate's appearance in London dates to only a few years before, in 1657 (Grivetti and Shapiro 2009). It had become a custom among European colonists in Central and South America long before this, however, as Thomas Gage observed. In 1625, as a young Dominican friar, Gage left England to seek fortune in the West Indies. He returned twelve

years later. In 1648, he published a book recounting his travels that included extended discussions of chocolate. While historians have no documentation, it might be presumed that some people in London had tried chocolate before 1657. Nevertheless, it clearly was something new in 1661, when Pepys first made a reference. His entry of April 24, 1661, reads, “Waked in the morning with my head in a sad taking through the last night’s drink, which I am very sorry for; so rose and went out with Mr. Creed to drink our morning draft, which he did give me in chocolate to settle my stomach.”

Pepys comments refer to chocolate usually as a morning drink, sometimes taken at a coffee house, and often considered for its curative value against a hangover that Pepys often ruefully admitted to in his diary entries. The “morning draft” that often began Pepys’s day was beer or ale, probably “small beer” with a lower alcoholic content. Pepys was not unusual in that Londoners of all ages usually drank beverages containing alcohol through most of the day for its antiseptic qualities in an age when water or milk was not safe (Shapin 2005).

Chocolate in London during this period was expensive, one pound (about half a kg) costing the equivalent of about \$70, and so associated with wealth and status. As what we might today call an “early adopter,” Pepys tried chocolate in a variety of ways to assess its effect (Loveman 2013). On May 3, 1664, Pepys suggested that morning chocolate had become his routine. He wrote, “Up, and being ready, went by agreement to Mr. Bland’s and there drank my morning draft in good chocolate, and slabbering my band sent home for another.”

A “band” was a lace-trimmed collar that affluent Europeans wore during this period; apparently chocolate’s ability to stain clothing also found early annoyance among the fashion-conscious. In an entry dated November 24, 1664, he wrote, “Out with Commissioner Pett, and he and I to a Coffee-house, to drink jocolatte, very good.” In diary entries Pepys spelled the beverage as chocolate, chocollatte, chocolatt, and jocolatte, reflecting a period before a standardized spelling had been established for the new beverage as well as many other words.

Pepys, like many reasonably well-off Londoners, grew to enjoy serving chocolate to visitors in his home. Most, and probably Pepys, acquired specialized equipment including a *molinillo* and chocolate cups as a sign of good taste (Loveman 2013). The truly wealthy began to include chocolate kitchens in their homes. In around 1690, Sir Christopher Wren designed a chocolate kitchen in Hampton Court Palace as part of William and Mary’s rebuilding. Chocolatier Thomas Tosier in 1717 joined the palace staff to become chocolate maker to King George I (Historic Royal Palaces n.d.). The Tosier company still made chocolate in 2021, and the Hampton Court chocolate kitchen was intact and open to tourist inspection (Reynolds 2019).

Inspired by the Hampton Court Palace chocolate kitchen, Australian novelist Karen Brooks said she consulted the Pepys diaries, with its repeated references to chocolate, as background for a historical novel, *The Chocolate Maker’s Wife* (2019). The story takes place from 1662 to 1667, during the years in which Pepys chronicled so many changes in English customs, including the introduction of chocolate (Brooks 2019).

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Peter, Daniel

See Milk Chocolate

Plain Chocolate

See Dark Chocolate

Poison

The threat of death by chocolate has fed centuries of fear and intrigue. It is not the chocolate itself that could do you in, unless you are a dog or cat (see **Dogs, and Chocolate**). It is chocolate as a vehicle, and a particularly effective one. Historically, it was nearly always served as a thick drink, strongly flavored and somewhat bitter. It also grew to become a daily habit among the aristocracy and clergy of Europe. What better way to disguise poison than in a familiar beverage? Strychnine might be the poison of choice, as chocolate would disguise its bitterness. Arsenic might even be better, as on its own it is tasteless. Both saw documented use.

The earliest story of death by poison-laced chocolate comes from Thomas Gage, the British cleric who in 1648 published a book based on his experiences in the New World. He included descriptions of chocolate customs and the popularity of the drink among all social classes. It was Gage who first described the "chocolate of Chiapas" story. Gage said that he had witnessed a bishop murdered because he threatened to excommunicate women who drank chocolate during the Mass. Gage claimed to be an eyewitness, trying to mediate, but subsequently the bishop fell ill and died. "A Gentlewoman with whom I was well acquainted in that City, who was noted to be somewhat too familiar with one of the bishops Pages, was

commonly censured to have prescribed such a cup of Chocolate to be ministered by the Page, which poisoned him who so rigorously had forbidden Chocolate to be drank in the Church" (Gage [1648] 1677, 231–232). Few, added Gage, grieved his death, "and it became afterwards a Proverb in the Country, Beware the Chocolate of Chiapa, which made me cautious . . . if they cannot have their wills, they surely will work revenge either by Chocolate or Conserves" (Gage [1648] 1677, 232).

Seventeenth-century diarist Samuel Pepys in London, an admirer who wrote often of chocolate's burgeoning popularity after mid-century, recounted the rumor that Lady Margaret Denham, wife of John Denham, died by poison. John was thirty years older than his wife, who was by all wags beautiful and flirty, and so it apparently was not surprising she had been having an affair with James, Duke of York. But Pepys wrote in November 1666 that Lady Denham, whom he apparently detested for her untoward behavior (calling her a "whore"), fell ill, dying in January 1667. "Some suspect her poisoned," wrote Pepys. The presumed culprit initially centered around the duke's wife, but later it was considered that her husband John did the poisoning. The vehicle was presumed to be her chocolate drink. In fact, an autopsy showed no poison, so the cause of death remains uncertain. She was twenty (*Sheffield Telegraph* 2017; Pepys [1660–1669] 1893).

The duke was brother of reigning King Charles II, and in 1685, the king himself became the focus of another chocolate-murder scandal when he suddenly took ill and died in February at age fifty-four. Word on the street and in the court was that his mistress poisoned his chocolate. Subsequent investigation indicated, however, that poisoning was not the cause of the king's demise. In another legend from the era evoking lover's rage, a Spanish lady supposedly took revenge by luring a faithless scoundrel to a trap, in which he was compelled to a suicidal choice: dagger or poisoned chocolate. He chose the chocolate and died within an hour (Coe and Coe 1996).

Stories of chocolate poisoning continued in the next century. A 1735 report indicated a Boston family was poisoned by arsenic in their chocolate, but survived. Frederick the Great of Prussia purportedly was so fearful of poison in his chocolate that he always tested some on the dog before consuming (Grivetti and Shapiro 2009). As chocolate's theobromine is naturally poisonous to dogs, the test was perhaps not a helpful indicator for humans.

Pope Clement XIV attracted enmity of the Jesuits after he suppressed the order in 1773. The Jesuits had achieved power and independence particularly in the New World, and the order's wealth was supported by an extensive cocoa export operation. Clement purportedly feared assassination, and in fact died only a year later. Suspicion fell on a Jesuit plot that poisoned the pope's chocolate. A later autopsy disproved the allegation, however (Coe and Coe 1996; Korten 2017).

Napoleon may have narrowly escaped poison added to his chocolate drink in 1807. In another spurned lover story, supposedly one of Napoleon's former mistresses, Pauline Riotti, was spotted by a cook adding a substance to the emperor's cup of cocoa. The cook notified Napoleon, who forced Riotti to drink the chocolate, after which she died. Historians, however, have not found enough evidence to authenticate the story.

They do, however, have plenty of evidence for the diabolical tale of what Victorian newspapers called “The Chocolate Cream Poisoner.” Christiana Edmunds, a resident of the English seaside tourist town of Brighton, beginning in 1871 engaged in a relationship with a local doctor. The doctor later claimed the relationship was not physical, but clearly it was emotional, and after the married doctor ended it, a box of chocolates appeared as a gift to the doctor’s wife. She became violently ill. The doctor accused Edmunds of trying to poison his wife, which Edmunds denied (Berkshire Record Office n.d.).

Peculiarly to local police, however, Brighton poisonings continued throughout the year, usually traced to chocolate creams purchased at a local shop. The poison was mostly strychnine, sometimes arsenic. No one died—until in July, when a father on holiday with his family gave one of the chocolates to his four-year-old nephew. The treat proved fatal (Jones 2016).

An investigation turned up no leads, and so the death was declared accidental. But poisonings continued, and public fear grew. Finally in August six packages of poisoned chocolates and other sweets were discovered in the mailboxes of prominent Brighton residents, including the newspaper editor. Oddly, Edmunds herself received one of the boxes. When police came to fetch it, she said she feared for her safety and thought the culprit might never be found (Berkshire Record Office n.d.).

Finally, after a handwriting analysis, people who had been unwitting accomplices came forward and Edmunds was arrested. She had tried to mislead authorities by sending a package of poisoned chocolate to herself. During her trial for murder, the court was unable to discover what Edmunds hoped to gain by poisoning residents at random, and the jury sentenced her to death. However, the sentence was commuted on a defense of insanity, and the Chocolate Cream Murderer spent the rest of her life in Broadmoor Criminal Lunatic Asylum (now Broadmoor Hospital) in Berkshire.

Chocolate also claimed a role in an earlier sensational murder trial, this one even more lurid, played out in Scotland. A young woman was accused of slipping arsenic into her lover’s chocolate. Dubbed by contemporary British journalists as “the crime of the century,” in 1857 the twenty-year-old Glasgow daughter of a prosperous family was alleged to have poisoned her twenty-nine-year-old lover after he threatened to make the secret affair public. Madeleine Smith, daughter of an architect, in 1855 began a relationship with Pierre Emile L’Angelier. As a tradesman, he was considered beneath her family’s social station. The secret liaison included letters from Smith to L’Angelier that by Victorian standards became ever steamier. Frequently while her family and servants slept, Smith served L’Angelier coffee or chocolate drinks through her bedroom window. He proposed marriage, and she agreed. However, Smith knew her family would not approve, and so when the family introduced her to what they considered a more suitable match, she changed her mind and tried to end the affair with L’Angelier. She asked him to return her letters, which by then numbered at least 250.

L’Angelier refused, in fact threatening to make them public if she did not marry him. Three months later he was dead. An autopsy showed he had ingested large amounts of arsenic, while acquaintances indicated he had been ill for weeks. Police searched his lodgings and found Smith’s letters.

The ensuing trial became a sensation, not only because of the almost Shakespearean story and because Smith was claimed by the press to be young and beautiful but also because Smith's letters exhibited ideas about sex that were scandalous for the time—in fact, that she enjoyed it outside of marriage. “My nightdress was on when you saw me. Would to God you had been in the same attire. We would be happy” (quoted in Grant 2017).

Smith's effort to keep the letters secret failed spectacularly, as they became a centerpiece in her ensuing trial for murder, and were read aloud in court. But the jury did not think they were enough, and while she was not declared innocent, under Scottish law she could go free for insufficient evidence to convict. Smith's notoriety, however, continued to dog her life. She changed her name, moved to London, married, had two children, divorced, remarried, and in 1916 moved to New York. She died in obscurity at age ninety-three under the name of Lena Warde Sheehy.

Was Smith in fact guilty of murdering her lover with poisoned chocolate? She was known to have purchased arsenic soon before his death. However, arsenic in the nineteenth century was easily available, not only as a pesticide but also as part of female cosmetic treatments to enhance a pale complexion coveted during the era. Arsenic has no taste, though at the time it was dyed dark to make it stand out in liquids. Cocoa's natural turgidity could disguise that. Today the Scottish national records office still keeps evidence from the trial, including “part of a cake of cocoa or chocolate which may have been used to administer the poison” (National Records of Scotland, JC26/1857/6/173). Author Somerset Maugham some years before Smith's death said she had confessed to him that she in fact was the killer. But historians are still uncertain whether the poisoned chocolate came from the hand of Madeleine Smith. In any case, the sensational case was still of interest a century later, the subject of books, a movie, and a BBC television program (Grant 2017; Undiscovered Scotland 2021; *Edinburgh Evening News* 2017; Healey 2021).

Military campaigns favored chocolate rations even in pre-Columbian times of the Aztec Empire. But military leaders also sometimes showed concern over the possibility of an enemy poisoning the supply. A 1749 story in *La Gazette* of Paris reported that soldiers in Malta were poisoned during battle; the unspecified substance was mixed with their chocolate as well as with their coffee and other beverages (November 22, 1749). Historians have documented cases of Nazis in World War II poisoning chocolate destined for Allied officers. The danger of poison contamination was considered so great that Hershey protected its chocolate military rations by placing each into a heavy cellophane bag, sealed with heat, then into a cardboard carton, then dipped into a wax mixture, twelve waxed cartons glued together, then packed into a wooden case that was nailed and reinforced with steel (Prinz 2017; Hershey Archives 2018).

Recent cases of poison by chocolate remain anecdotal today, although one documented trial from France in 2008 found that Ghislain Beaumont, forty-five, murdered his parents by serving them chocolate mousse tainted with insecticide. He reportedly told the court he was living with them, but responded with the

poisoned chocolate after they refused to allow him to leave and move in with his girlfriend (*Daily Mail* 2008).

While few documented cases of poisoning through chocolate actually exist, the idea continues to fascinate. Among fiction exploiting the chocolate-poison theme, perhaps the most well-known is Agatha Christie's "The Chocolate Box." In a short story first published in 1923 (dramatized for television in 1993), detective Hercule Poirot recounts an early case in which he suspected the vehicle of death was secreted into a box of chocolates. But Poirot declares it was the only case in which he failed and suggests to his listener that if he ever should become conceited, "Eh bien, my friend, you shall say to me, 'Chocolate box.' Is it agreed?" (Christie [1923] 2003, n.p.).

"Death by Chocolate" is a popular cake served worldwide. Its invention is uncertain, although first reference in print seems to date from 1981, in a *Los Angeles Times* review of a restaurant that featured a chocolate cake called *La Mort au chocolat*. It may, however, have an earlier origin. Multiple sources contended that in the late 1970s several Cleveland, Ohio, restaurants offered a dessert called Death by Chocolate based on a fictional dish from a children's television series, though the Cleveland connection seemed uncertain (Friedman 2012; Definitions n.d.).

Death by Chocolate was filed as a trademark in the United States by a restaurant chain but abandoned when the chain went out of business (Justia Trademarks). It was in 2021, however, still listed as trademarked in Britain by F. T. Wood & Sons Ltd (trademarkelite.com). Despite the trademark, it is widely used for many chocolate-based desserts. Beyond treats, Death by Chocolate has propelled a number of mystery novels, including at least two series. Sally Berneathy by 2018 had published seven books in her Death by Chocolate series featuring amateur detective Lindsay Powell, owner of a Kansas City chocolate shop by that morbid name. Another series by Sarah Graves featured several mysteries including the terror-inducing *Death by Chocolate Frosted Doughnut*. In recent television, a 2008 episode of the Midsomer Murder series featuring detective Tom Barnaby was entitled, "Death in a Chocolate Box" (IMDB.com).

A successful Houston, Texas, roller derby player in 2015 went by the derby-name "Death by Chocolate." She explained she chose the name in 2015 because, "ohhh, danger and tastes good too" (WFTDA 2015). In 2017, "Death by Chocolate," a rock group from Switzerland, saw some success with its recording "Crooked for You."

As of 2021, however, there appeared to be no book, sports figure, or rock group that featured the name "Life by Chocolate."

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Postage Stamps

Philatelists who like to form topical collections are sometimes surprised to find that favorite foods can be the basis for fairly large accumulations. One of those collectible foods on stamps is chocolate. In 2021, the world census of stamps featuring a chocolate-related theme was 192 (Miller 2021). One of the first was issued in 1930, by Ecuador. Ecuador's stamp, appearing in the U.S. Scott postage stamp catalog as Number 301, is a 5-centavo denomination celebrating the one hundredth anniversary of the Ecuadorian Republic. It depicts a cacao pod of the famous Ecuadorian variety Nacional. A second issue from the same year commemorating the same anniversary depicted cacao and coffee farming.



By 2021, countries worldwide had issued nearly 200 stamps featuring a chocolate theme. A few had issued stamps that also smelled like chocolate, and in 2013 Belgium issued stamps that not only smelled like chocolate but also tasted like it. (This postage stamp is from Sweden.) (Alexander Mirt/Dreamstime.com)

Another well-known early stamp relating to chocolate was issued in 1956, in Colombia. The 5-centavo stamp, Scott 755, features a fine engraving of a woman picking pods from a cacao tree. It is part of a series that also includes three versions of coffee-harvesting. While such early issues on the chocolate theme seem quite old, they are usually inexpensive to collect.

Many other countries have issued stamps on the theme, including:

- Antigua and Barbuda's chocolate bar
- Austria's chocolate shop and confection
- Belgium's harvesting and fabrication series
- Britain's "Charlie and the Chocolate Factory" and Cadbury-made "Curly Wurly"
- Cameroon's chocolate factory
- Canada's chocolate-heavy Nanaimo bar
- Costa Rica's cacao pod
- Curaçao's heart-shaped chocolate box
- French Guiana's chocolate-processing operation

Gabon's cacao tree
 Germany's "The Chocolate Maiden" painting
 Granada's cacao pods and leaves
 Italy's commemoration of Nutella
 Ivory Coast's cacao pods
 Mexico's opened cacao pod
 New Zealand's fish-shaped chocolates
 Papua New Guinea's cacao pods
 Portugal's chocolate truffle, pods and containers
 São Tomé and Príncipe's cacao pods
 Spain's cacao pod
 Surinam's cacao pod and branches
 Sweden's chocolate candies and beverage
 Togo's cacao pod
 Trinidad and Tobago's cacao pods
 United States' Hershey's Kiss, and a famous chocolate factory skit from the early television series *I Love Lucy*

Ghana, the second most important cocoa-producing country in 2021 after Ivory Coast, has issued about a dozen stamps beginning in 1948 depicting themes of harvest and production. Venezuela issued a set of ten featuring production, and even the Vatican in 1992 issued a stamp depicting a cacao pod and tree branches.

A few countries have taken the chocolate theme a step further, even two steps further. The first step is adding chocolate scent to a stamp. Scented stamps are no longer new, having been issued by many countries; in 2015 the count was ninety. Of those, several countries featured chocolate fragrance on stamps resembling chocolate chunks or confections: France, Grenada, Liberia, and Switzerland (Linn's Stamp News 2015).

Belgium, well known for its highly conched "Belgian chocolate" (see **Conch**, **Conching**), took the second step. In March 2013, just in time for the Easter holiday, the Belgian postal service put on sale (at 6.20 euros) a series of five stamps that not only smelled like chocolate but also tasted like chocolate. Chocolate lovers could lick the stamp for flavor, the gum side, but the front as well.

The Belgian postal service's production of a half-million chocolate-flavored stamps, it said, was the first stamp issue ever that you could (sort of) eat. It created a minor flurry of international mass media attention. The BBC in Britain followed the manufacturing process to discover that the paper was infused with cocoa aroma, with an edible varnish applied to the stamp comprising 40 percent cocoa. BBC reporters asked consumers what they thought, the responses ranging from yum to yuck (Ukanah 2013). In a stamp collectors' online chat, one collector sniffed that it was a "despicable gimmick." Another worried that collecting the issue could permeate an entire stamp album with a tiresome chocolate smell (Stampboards 2013). Today for collectors, however, Belgium's famous edible

chocolate stamp is not easy to find on typical online platforms. In 2021, it was still available from the Belgian postal services website, postbeeld.com, 12 euros for the five-stamp sheet.

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Polyphenols

See Flavonoids

Processors

Entrepreneurs since the 1700s have invented machines to simplify the tedious grinding of cocoa beans. In 1729, Joseph Fry of Bristol purchased a patent from Walter Churchman for a steam-based cocoa-grinding machine. A few years later, in 1737 colonial North America, the *Boston Gazette* featured an advertisement offering a machine-based cocoa-grinding service: "By a gentleman of this Town, Salem, is this Day bro't to perfection, an Engine to Grind Cocoa; . . . and it may be depended on for Truth, that it will in less than six Hours bring one Hundred weight of Nuts to a consistence fit for the Mold" (quoted in Miller 2021, n.p.).

In 1826, Swiss chocolate maker Philippe Suchard invented the modern *melangeur* that uses granite rollers to grind cocoa nibs. Similar machines are still used in smaller grinding operations. But in recent years perhaps the most consistent change in the worldwide cocoa sector has been consolidation of the industry into a few multinationals of worldwide dominance. In chocolate manufacturing, the public face by 2021 had grown into a few enormous multinationals which moved to aggressively acquire famous old brands, notably Mondeléz and Ferrero Rocher. But nearly invisible to the chocolate-loving public has been similar consolidation among cocoa-sector intermediate processors.

Sometimes called chocolate grinders for their basic activity, processors turn cocoa beans into chocolate products offered wholesale to manufacturers and pastry chefs. Products include chocolate liquor (also called chocolate mass) dark and milk chocolate, some with flavorings, cocoa butter, chocolate powder, and specialty products. Processors generally do not make an effort to build a mass media presence through advertising or publicity, as their products seldom become part of familiar retail displays. But within the industry the processing side has seen an enormous reduction in competition.

At the end of the twentieth century, about forty processors supplied intermediary chocolate products to most of the world. Two decades later, three big suppliers dominated. The three in 2018 produced 60 percent of the world's chocolate, selling not only to the big five retailers (Mars, Ferrero Rocher, Mondeléz, Nestlé, and Meiji; Hershey was number six, Lindt number seven in 2020) but also to food companies, restaurants, and bakers around the world. Only one can be called a chocolate company, Barry Callebaut (Squicciarini and Swinnen 2016; Leissle 2018).

Barry Callebaut rose to become the world's largest processor after a 1996 merger of French chocolate producer Cacao Barry and Belgian producer Callebaut. Its 2013 acquisition of Petra Foods cocoa division (Singapore) brought the now Zurich-based multinational to world dominance as number one processor (Barry Callebaut n.d.). Callebaut and Cacao Barry brought an extensive cocoa production history to the merger; both produced chocolate products since the early 1800s. While in 2021 it did not sell consumer chocolate products, Barry Callebaut did maintain familiar brands in its wholesale division, including Caprimo, Carma, Gertrude Hawk, IBC Belgium, Mona Lisa, Van Leer, and Van Houten. The Callebaut brand chocolate is available to chefs and chocolatiers in thirty-eight varieties (Barry Callebaut n.d.). Perhaps because it had always maintained a strong cocoa presence, Barry Callebaut has fostered a somewhat stronger public side than its competitors. It has promoted what it called a fourth style of chocolate, ruby, and a style made with the entire pod, called Wholefruit Chocolate. Barry Callebaut also reached out to pastry chefs and chocolate professionals with its Chocolate Academy, twenty-nine locations worldwide featuring master classes and live-streamed videos for serious chocolatiers (Chocolate Academy n.d.).

The world's second- and third-largest processors had until recently no experience in the cocoa sector. In 2021, they remained little known among cocoa non-professionals. Cargill, a Minnesota commodities trader established in the mid-1800s, diversified its business into cocoa some 150 years later. Acquiring European processors to boost market share, Cargill built grinding operations in West African cacao-producing countries. A rival new cocoa-sector commodity trader, Archer Daniels Midland (ADM) of Chicago, in the early 2000s soared to challenge Cargill, while Cacao Barry and Callebaut merged as a strategy to maintain market dominance (Squicciarini and Swinnen 2016).

But ADM spun off its cocoa operation in 2015, selling to Olam International Ltd. for \$1.2 billion (Gelski 2015). Olam was by far the newest operator in commodity trading, having been established in 1989 in Singapore. It acquired familiar names including deZaan cocoa powder produced in the Netherlands and Joanes cocoa, a South American brand (Olam n.d.).

Cargill's familiar brand acquisitions included Ambrosia, Gerkens, Merckens, Peter's, and Wilbur. Peter's is historically the most famous name in milk chocolate; Daniel Peters in 1876 invented the first successful milk chocolate bar using Nestlé's dried and condensed milk products. Wilbur Chocolate, established in 1865 in Lititz, Pennsylvania, just down the road from Hershey, marketed Wilbur Buds. It supposedly gave Milton Hershey the inspiration for his similar Hershey's Kisses. Wilbur went to court to block the purported copycat, but Hershey's Kisses

prevailed. In 2021, Cargill still offered historic Wilbur Buds from its Pennsylvania store (Wilbur Chocolate 2019). Cargill in 2021 listed thirty-one styles of dark chocolate and twenty-two styles of milk chocolate for the wholesale trade (Cargill n.d.).

Consumers and activists concerned over fair trade and sustainability practices in the cacao sector usually focus on “big candy,” that is, the largest retailers. As they see less mass media attention, the big processors tend to be ignored, although they are arguably more important players in this sector. But the three big processors in 2021 included extensive descriptions of their sustainability initiatives, particularly in the large cacao-producing nations of Ivory Coast and Ghana, in their corporate reports. These global operators also have made aggressive investments into on-site grinding operations in West Africa, an unusual example of cacao being processed in its origin countries instead of in Europe and North America as it had been throughout most of its history. In 2020–2021, the world’s top cocoa-bean-processing country was Ivory Coast, 610,000 tons. Ivory Coast was also the world’s top cocoa-bean producer. But the second-largest processing country was still in Europe, Netherlands, with 600,000 tons (Statista 2021). The move to add value to a raw commodity like cocoa beans in the country that produces it should bring more economic stability back to the suppliers, but cocoa-bean processing is highly automated and so does not require a large labor force.

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Puzzles

See Chocolatier (Video Game)

R

Rowntree (UK)

See Cadbury Chocolate (UK); Nestlé, S.A. (Switzerland)

Ruby Chocolate

Chocolate manufacturers have bedeviled the world of confection through more than a century of secret inventions and patents. Most famous, immensely successful, and phenomenally popular was the invention of milk chocolate in bar form. Daniel Peter in Switzerland worked out his secret formula at the end of the 1800s. By the beginning of the next century, Swiss milk chocolate began to define the chocolate industry as the new product enjoyed strong growth in Europe and the United States. Jealous manufacturers worked to discover Peter's secret. In 1900, Hershey offered its Hershey Bar, and in 1905 Cadbury offered its Dairy Milk. The Swiss secret finally leaked out. Today the "second type of chocolate" after dark chocolate defines for many people what chocolate ought to taste like.

Nearly a century after Peter's death, a Swiss-based multinational rattled the cocoa industry with what it argued was another totally new type of chocolate. In 2017, Barry Callebaut announced what it called ruby chocolate. It was, said the manufacturer, the "fourth type of chocolate" (Barry Callebaut n.d.) and the first major type since Nestlé introduced white chocolate in the 1930s. Ruby, Barry Callebaut's trade name for its new pink-hued bar, was produced based on what the manufacturer described as components of "unique ruby cocoa beans" sourced from three countries, Ecuador, Brazil, and Ivory Coast. Barry Callebaut promised that ruby chocolate contained no added flavors or colors but was produced by managing fermentation, temperature, conching time, and acidity level. Citric acid also was used and was part of the ingredients list, but the actual production process was a "trade secret" (Barry Callebaut 2021). Consumers had their first opportunity to try it in 2018 in a KitKat bar produced by Nestlé; Barry Callebaut does not itself produce ruby chocolate for retail sale.

Barry Callebaut described ruby chocolate's flavor as a "tension between berry-fruityness and luscious smoothness," explaining that the taste and color were naturally present in the beans (Bandoim 2019). Tasters agreed the product had a berry-like flavor. Some compared the taste to raspberry-flavored chocolate. Others described it as "tangy and sour." Some said it "did not taste like chocolate."

Ruby was promoted as "millennial chocolate" for its presumed target market. Pink food items such as rosé wine and gaily colored "unicorn foods" by 2017 were seeing growing market success among the millennial generation. Peter Boone, Barry Callebaut chief innovation and quality officer, affirmed in 2019 that "ruby

chocolate not only satisfies a new consumer need found among millennials—hedonistic indulgence—but also high purchase intent at different price points.” In 2021, the bars were available from several chocolate retailers at a cost comparable to that of brands sold as premium fine chocolate (Thompson 2019; Nest and Glow 2021; Dame Cacao n.d.).

Initial skeptics of the “fourth chocolate” included the U.S. Food and Drug Administration (FDA), the federal regulatory agency in the United States that sets a legal definition of chocolate. While the product did contain the necessary ingredients that defined chocolate, they were apparently not present in FDA-required ratios. However, in 2019, the FDA granted a temporary permit to “deviate from identity standard” as a way to test-market ruby chocolate. The permit indicated that any added ingredients “cannot imitate the flavor of chocolate, milk or buttery, berry or another fruit” (Schilleer 2019; Shiffer 2019).

Despite both the FDA declaration and Barry Callebaut’s assertions, detractors jumped on the revelation that citric acid was part of ruby chocolate processing. A food-related website billing itself as a source of healthy and natural food information declared flatly, “this citric acid gives it the sour tangy flavor that many think tastes like berries as their brain sees the pink color and berries are very acidic” (Nest and Glow 2021).

It was tempting to presume that, as citric acid is indeed an ingredient in most berries, including raspberries. However, researchers in 2021 concluded that Barry Callebaut’s claim was correct. A soak or spray of citric or phosphoric acid, the study noted, will under appropriate conditions leave cocoa nibs with a red or purple color. This may produce a final product that appears pink. The citric acid treatment, then, had nothing to do with the taste but with the appearance. In fact, citric acid is listed in FDA regulations as a neutralizing agent, that is, a treatment to reduce chocolate’s natural acidity (U.S. Federal Register, Part 163, 2021). While the researchers acknowledged that the exact process was patented, they observed that in 2012 the manufacturer was granted a European patent for a processing using unfermented or underfermented cocoa beans. This could produce a berry-like flavor. “Most probably, the lack of fermentation and the acidification step, described in Callebaut’s patent, are the key steps in the production of ruby chocolate” (Tuenter et al. 2021).

As of 2021, Barry Callebaut was promoting ruby chocolate to pastry chefs and chocolatiers. Bars were still not widely available to consumers, although brands could be purchased online and at specialty grocery and health food stores. Confectionary industry observers noted that introduction of new ruby chocolate products had been slow and suggested that original public enthusiasm was waning for a chocolate that did not really taste like chocolate. Chocolate blogger Sharon Terenzi called it a “questionable product born to catch the eye, create buzz, and nothing more.” But in 2021, Barry Callebaut showed its continued commitment to the product by producing *Ruby Encyclopedia*, a free internet download with eight chapters and forty-seven recipes for ruby chocolate. The industry newsletter *Confectionary News* said the encyclopedia offered ideas for “the next generation of confectionary” (Dame Cacao n.d.; Myers 2021; Thompson 2019).

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S

Sahagún, Bernardino de

See Franciscans (Religious Order)

São Tomé and Príncipe

See Chocolate Islands (São Tomé and Príncipe)

Slave Trade

Chocolate's ties to slavery and compelled labor reach back as far as the Aztec Empire and as close as 2021. In fact, a chocolate historian could make the plausible argument that for more than five centuries, without interruption, cocoa beans that became the world's delight often were either produced by slaves or associated with slave-related coercion.

Reasons for this are more complex than simple racism, although that certainly has been part of the shameful connection between a luxury food and inhumane production. The slavery that has dogged chocolate farming throughout history served political interests, business interests, religious interests, humanitarian interests, and even the desperation of the impoverished.

The definitions of slavery as opposed to coerced or compelled labor differ, though both in effect allow one group in society to control another. Slaves become human property, like cattle, bought, sold, and treated as such. Coerced laborers are not owned as slaves in principle but are forced under threat of violence to work for political, social, or business groups. Exploited workers, a related category, may be paid, but at levels far inferior to the value of their work (Walker 2007).

Coerced labor in cacao production dates to the pre-Columbian Aztec Empire (and probably the Maya Empire before that) in what is now Mesoamerica. Farmers in the area around the Aztec capital at Tenochtitlán (now Mexico City) were unable to grow cacao, a food that had become central to Aztec power and culture. In response, Aztec armies conquered the cacao-growing area of Soconusco. As tribute, it required natives to produce an enormous crop of cocoa beans and transport it to Tenochtitlán. Documents indicate the annual tribute totaled 200 Spanish *cargas*, 4.8 million beans (Mcanany and Murata 2007; Presilla 2009; Leissle 2018). After the conquest of 1521, Spanish colonists saw the profit in cacao and moved to preserve the same coercive tribute system of Soconusco natives. As Spain needed more and more income to pay for war and economic decline toward the latter 1500s, the king turned to cacao. By 1571, the Soconusco tribute to the king of



Child labor has been a part of cacao farming through most of chocolate's history. This stereo card copyrighted in 1903 includes the caption, "Youthful Toilers on a Lime and Coco Estate, Dominica, B.W.I." Then part of the British West Indies, the Dominican Republic today still supports a small cacao operation. Children also still represent a significant part of cacao farming: in 2019 about two million worked on the farms, mostly in Ivory Coast and Ghana. (Library of Congress)

Spain reached 400–600 *cargas* and was still on the increase (Norton 2006; Forrest and Najjaj 2007).

Coercion of native peoples to produce more and more cocoa beans became impossible. Natives in Soconusco and Guatemala, also a source of cacao for Spain, perished from disease and brutal overwork compelled by Spanish overlords. Smallpox, the hideous virus brought by Europeans, killed the first wave of Indigenous peoples in Central and South America. Later deaths from war, brutal labor, and sometimes actual enslavement wiped out most of the rest. Estimates vary, but at least 80 percent of native peoples died in the century following European colonization. It may have been up to 90 percent or more (Coe and Coe 1996; McNeil 2006).

Slavery of Indigenous peoples in Spanish and Portuguese colonies came to an end on May 29, 1537, at least officially, by decree of Pope Paul III. "Sublimus Deus" declared that natives in the New World "may and

should, freely and legitimately, enjoy their liberty and the possession of their property; nor should they be in any way enslaved" (Pope Paul III, encyclical, 1537). This may have formally ended native enslavement, but they could still be forced to work through the *encomienda* system that compelled labor in lucrative New World plantations, including cacao. As the population of natives dwindled, however, colonists searched for an alternative means of cultivating sugar cane, tobacco, cotton, and coffee and cocoa beans for a growing voracious appetite in both the New World and the Old. The pope may have forbidden native enslavement, becoming a dead letter when few natives were left. But the decree did not mention Africans (Squicciarini and Swinnen 2016).

A three-way slave system that developed in the 1500s endured for three and one-half centuries until its international prohibition by treaty in the mid-1800s. The system brought to the New World an estimated twelve million West Africans, the largest bulk to cacao-producing Brazil (and about 5 percent to what became

the United States) (National Park Service 2020; Walker 2007). As demand for tropically grown commodities soared by the end of the seventeenth century, more and more Africans were captured by slave traders or kidnapped by rival tribal chiefs in West Africa, transported to coastal slave-trading hubs, and sold to European slave merchants. Ships transported the captives to New World ports. At those ports, the merchants would take on loads of commodities destined for Europe, including cocoa beans. In Europe, these would be offloaded and the holds refilled with manufactured items that could be traded for more slaves. Salvador de Bahia, Portuguese capital in eastern Brazil, as the top New World slave port, received between 3.5 and 5 million slaves between 1538 and 1850. The state also became Brazil's colonial center for cacao cultivation (Walker 2007).

An expanding trade in cocoa and other commodities could be accommodated only by relying on slave labor. Every European colonial power participated in the lucrative slave trade. In cocoa beans, governments could profit by taxing them as a luxury, and merchants could grow wealthy by marketing them to people with means who were the original consumers before chocolate became an everyday confection. Even religious orders could benefit from cacao. In fact, the Jesuits, in particular, grew into a powerful Catholic order underpinned by its massive cacao operations in Brazil, Paraguay, and Mexico. At the beginning, Jesuits employed natives to harvest wild cacao growing in the Brazilian Amazon. But this proved inadequate, as natives could not be easily coerced, often simply running away into the jungle. The order came to rely on the more reliable labor of African slaves that were flooding into Brazil (Prinz 2017; Grivetti and Shapiro 2009). The wealth of cacao cultivation behind Jesuit influence attracted attention of both the Portuguese and Spanish monarchies, which finally expelled them from their New World colonies and took over their cacao operations (Coe and Coe 1996). Pope Clement XIV suppressed the order in 1773 after it had become a threat to both papal and monarchical power (Mörner 1966).

In the North American colonies that became the United States and Canada, slavery was associated with cocoa in a different way. The tiresome and labor-intensive process of grinding cocoa nibs for chocolate in factories and wealthier homes was often given over to slaves. Advertisements for slaves sometimes mentioned their ability as chocolate-grinders. One such ad in 1762 sought to sell a "lusty Negro man, used to grinding chocolate" (Grivetti and Shapiro 2009, 367).

The origin of most slaves in West African regions perhaps ironically became the origin of most of the world's cacao. Brazilian independence from Portugal in 1823 brought an end to the lucrative cacao connection between that colony and the Portuguese Crown. But King John VI was not about to give up the profitable trade of cocoa beans. In one of many business coups over chocolate that has marked the centuries, Portuguese traders transported Brazilian cacao seedlings for the first time from the Western Hemisphere to the Eastern. Cacao was transplanted from Bahia to São Tomé and Príncipe, tiny islands off the coast of present-day Gabon. Along with cacao came the Portuguese plantation system that relied on slave labor to produce cocoa beans (Grivetti and Shapiro 2009). Pushing out the original coffee and sugar cane, the islands' cacao plantations grew to become the world's top

supplier by 1900. The chocolate trade of America and Europe came to know them as the “Chocolate Islands.”

Slavery in Brazil continued to support cacao production long after it was banned in every other cacao-producing country. It finally ended in 1888. In colonies still under Portuguese rule it was officially abolished in 1876, but the huge cacao plantations on the Chocolate Islands could not survive on salaried employees. The solution was coerced labor.

While a rationale for buying and selling human beings could no longer persuade the world community by the end of the nineteenth century, that did not mean the Europeans and Americans who colonized much of cacao regions had grown racially sensitive. Colonial traders made an argument that the now-free Africans must be rescued from the darkness of African tribal violence and ignorance to follow the beacon of Western enlightenment. The Portuguese portrayed Africans as savage, childish people who could be redeemed by government tutelage, along with an obligation to aid in their redemption. The way to do that was to work in the plantations. Colonial powers accepted the argument that a tropical climate encouraged indolence, superstition, and polygamy, and so the discipline of work in cacao or other plantations would be cleansing and redeeming (Macedo 2016). At the same time, colonial powers were beginning to transfer cacao to mainland West African colonies, notably the Ivory Coast and Gold Coast (now Ghana).

As the tiny Chocolate Islands emerged as a leading cacao producer, the colony’s modern and scientific production methods also drew the world’s admiration. But its treatment of workers from Africa began to tell a different story. Rumors began to filter out that described what amounted to a labor system little different from slavery. The *roças*, cacao plantations under the Portuguese system, were purportedly accepting Africans captured in Angola and required to sign documents they could not read that in effect forced them into lifetime service without possibility of escape (Grivetti and Shapiro 2009).

The rumors troubled William Cadbury in England. As one of the world’s largest manufacturers of chocolate, Cadbury had moved to import over half the company’s raw product from São Tomé and Príncipe. Cadbury’s company was imbued with the family’s Quaker values; he believed that it would be immoral to source cocoa beans from a country that coerced its workers. Cadbury sent Joseph Burt in 1905 to investigate the system. Findings agreed with those of investigative reporter Henry W. Nevins. They showed “confirmation of all the worst reports that have from time to time filtered through to the public, of the inhuman treatment of the weaker races of this vast district, by white men” (Higgs 2012; Cadbury, Burt, and Horton 1910, viii). In response, Cadbury organized a boycott, and the Portuguese government promised reforms. While the controversy faded with the beginning of World War I (1914–1918), postwar investigations still showed evidence of coerced labor (Higgs 2012).

It could be presumed that slavery, coerced labor and exploited labor has long ago faded into cacao history. Unfortunately, that is not true. A British news investigation in 2001 rocked the huge and profitable world of cocoa multinationals by reporting widespread child slavery in Ivory Coast cacao farms. That Western

African country had grown to be the world's largest producer. The report said children from poor African nations were being rounded up and transported to the cacao farms where they worked as virtual slaves in "appalling conditions" (Lawrance and Roberts 2019). British and U.S. government investigations resulted in most large manufacturers promising to end child labor on cacao farms (John 2002). But those solemn promises as of 2021 did not succeed in removing child labor from the cocoa production chain. In 2019, about two million children were working in West Africa's cocoa farms. However, the allegation that they were slaves seemed mostly to have been disproved. Some desperately poor families sent their children to work the cacao trees, a better alternative than sending them to become prostitutes. Others were children of cacao farmers themselves who were expected to help out on the farm. In 2020, it was still clear, however, that children were sometimes coerced, threatened with violence, or exploited to work in cacao operations. While some reports showed that progress had been made, the 2018 Cocoa Barometer report, issued by a cocoa sector watchdog group, concluded that child labor could not be eradicated without addressing the larger issues of systemic poverty and poor local infrastructure (U.S. Department of Labor 2019; Whoriskey and Siegel 2019; Voice Network 2018). Chattel slavery may be gone from the production of cocoa beans, but coercion and exploitation remain, despite sustained attempts both from industry and government to put an end to it.

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Spanish Inquisition

Chocolate has unfortunately played a role in the cruelty of humanity throughout its history, in both the New World and the Old. The Catholic Inquisition was established in Spain just before Christopher Columbus reached America. By the early 1500s, inquisitions grew in power as Jews and Muslims were expelled from Spain unless they became Catholic. Many of them did convert, or at least claimed that they did. The Inquisition was set up to punish those who would not convert or whose claims were regarded as suspect. Those converts accused of secretly practicing their old faith were called to the inquisitor to give account of themselves. In practice, Jews were almost exclusively the targets of the Inquisition.

After the Spanish expulsion of Jews in 1492, many sought refuge in Portugal. Hope for tolerance there was short-lived, as only a few years later the Portuguese Crown established its own Inquisition. The king gave nonbelievers (mostly Jews) the same two choices: convert or leave.

Many chose conversion, although some continued to practice their faith in secret, and so were always under the watchful eye of the inquisitor. But those who did manage to stay were believed to have built trading relationships with the Portuguese New World, most commonly Brazil. Brazil had cacao (Prinz 2017). The first solid evidence of chocolate use in Spain dates to 1544. By 1549, when Brazil was established as a Portuguese colony, cacao was already one of its most important crops, relying mostly on the forced labor of natives to extract and process the beans.

In 1540, Portugal established its own version of the Spanish auto-da-fê—the term given to a public spectacle of punishment for Inquisition victims. Through the rest of the century, thousands of Jews fled Iberia. Some were content to stay

close to their enemies, however, moving just slightly north to the area around Bayonne, France. The level of tolerance in France was (slightly) higher, as the Inquisition was by this time solely a Spanish and Portuguese effort. It is believed that some refugees were apothecaries, that is, pharmacists, who for centuries were principal purveyors of chocolate as a medicine. Around one thousand religious refugees from Portugal were living around Bayonne by 1692 (Terrio 2000; Académie du Chocolat de Bayonne n.d.; Prinz 2017).

Some historians speculate that chocolate found its first introduction outside of Spain and Portugal thanks to Jews fleeing persecution. The legend—celebrated as fact in Bayonne—is bolstered by the port city’s centuries-old fame as a town known for high-quality chocolate. By 1854, thirty-two chocolate factories operated there. Historians more skeptical suggest that the Jews did not find France to be much more welcoming, as in 1615 French king Louis XIII signed an edict of expulsion for all Jews. Was that the end of the Jewish chocolate link? Perhaps not. Other historians note that the king’s order was mostly for show, as no Jews officially lived in France anyway at this time. The Jews around Bayonne were long converted to Christianity, or so they said (Harwich 1992; Terrio 2000; Rossin 2013).

Did Portuguese refugees who likely were part of the growing cacao trade between colonies and the Old World bring their knowledge with them? Possibly. One thing is certain, based on numerous eyewitness accounts: while watching the hideous public entertainment of the autos-da-fé, spectators enjoyed biscuits and chocolate. Toward the last half of the 1600s, as chocolate use swept from Spain to the rest of Europe, one French ambassador to Spain’s wife wrote in 1680 that she found the entire auto-da-fé spectacle to be despicable. But, wrote Marie de Vilars, she did appreciate the chocolate. She added that her daily use of the Spanish New World food brought great health. Inquisition records indicate chocolate use was also common among Inquisition victims, used to bribe or barter in jail, taken as food delivered by servants, or sometimes offered as bribes to keep a target from arrest (Coe and Coe 1996; Wilson and Hurst 2012; Prinz 2017).

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Sprüngli, David

See Conch, Conching

Stamps, Postage

See Postage Stamps

Stubbe, Henry

By the mid-1600s, chocolate had become familiar to most of Europe, one of the new beverages from exotic places that included coffee and tea. As with the last two, chocolate was originally introduced not as an indulgence, but as a medication. The pivotal early work considering chocolate for health became a reference for most subsequent writing through the rest of the century. Spanish physician Antonio Colmenero de Ledesma in 1631 issued a small book examining the New World food for its health benefits based on Galenic (humoral) medicine of the era. The book's importance was magnified as it moved to other countries in translation just as cocoa beans were becoming common enough to be easily accessible, at least to people of means.

Subsequent early books examining chocolate for health nearly always began with material from Colmenero, usually with credit. Henry Stubbe's 1662 work was not an exception. Stubbe, English physician, essayist, scholar, and for a time doctor to English Restoration king Charles II, counted among his works a treatise on chocolate. In 1662, he published *The Indian Nectar; or, a Discourse Concerning Chocolata*. Stubbe's work was based on personal observation in Jamaica. In April 1662, Thomas, Baron Windsor, was sent by the king to establish a civilian government on the island recently conquered as part of a war with Spain. Baron Windsor began his tenure with a survey of the island and its natural features. Stubbe accompanied surveyors on part of the trip and produced one of the first descriptions of Jamaica under British control (Buissieret 2009). But Stubbe was particularly interested in the cacao that the Spanish had cultivated on the island. Cocoa had become a sustaining food for British occupying soldiers, Stubbe observed, and as a doctor he was aware of Colmenero's treatise in English translation published twenty-two years before. Acknowledging Colmenero, Stubbe proposed to examine the cocoa bean as a health food from the perspective of an English physician.

Stubbe fell ill in Jamaica, as did Windsor, and so both returned to England. Stubbe became physician to the king. He filed his report on Jamaican observations with the Royal Society, in 1662 newly created by the king as a response to the French Académie des Sciences. The Royal Society, however, did not indicate enthusiasm for Stubbe's work, and so the physician spent the rest of his life issuing pamphlets disparaging the august group (Buissieret 2009).

Stubbe was not the first Englishman to write about chocolate; Thomas Gage in 1648 considered it as part of a longer work covering his time in the West Indies (see **Gage, Thomas**). Stubbe clearly was familiar with that work, as he repeated

Gage's "chocolate of Chiapas" story (Grivetti and Shapiro 2009). But Stubbe's attention to chocolate shows he considered a new and novel approach to medical research based on scientific experimentation, and not ancient humoral "library medicine," that seemed inadequate to examination of new foods like cocoa. Stubbe recounted the long debate regarding chocolate's category under the humoral system but seemed skeptical, saying, "fine, let men debate eternally the temperament of the nut" (Stubbe 1662, 43). Instead, Stubbe chose direct observation, experiment, and the scientific method. He tried grinding it, separating the fat, examining it under a microscope, and experimenting with it on himself to see the result (Albala 2007; Stubbe 1662). In particular, Stubbe took interest in chocolate's reputation as an aphrodisiac: "As for chocolate, how effectual it may be herein, I understand not by experience: but since the most amorous nationalities in the world drink it, it is very possible, it may conduce thereunto much. If it be the design of physics to preserve nature, and free her from superfluous collections of humours; and nothing doth the better then [*sic*] chocolate, as far as venery is but the collection and ejection of a superfluity gathered in, and about the testicles: without doubt physicians cannot decline to recommend it" (Stubbe 1662, 141).

Stubbe showed a bit of embarrassment at that conclusion, adding, "I know many will be apt to censure this discourse, as tending to sensuality, and the upholding carnal lusts and desires: but I suppose the more prudent will acquit me from any such imputation; since that is not the use, but abuse of chocolate, and is common to it with all other meats of good nourishment: against which I do not hear them so to declaim as to interdict them totally" (Stubbe 1662, 142).

While not admitting to directly experimenting with chocolate's usefulness in a sexual context, Stubbe did argue from experience for chocolate's many other benefits. His studies indicated the beans could help headaches, twelve beans, to be specific. He found it to be a laxative, contrary to reports that it caused constipation. It could improve urine flow, dissipate flatulence, strengthen the heart, promote digestion, and, depending on what was mixed with it, treat toothaches and ulcers, among other things. He declared it nourishing, observing that it "doth fatten," as soldiers in Jamaica were able to survive solely on cocoa drinks with sugar (Dillinger et al. 2000; Lippi 2015; Grivetti and Shapiro 2009).

Stubbe observed that English often added milk or eggs, although it may not have been a preference as much as a way to stretch use of the more expensive cocoa. Recipes from the court did not mention adding these dairy products (Love-man 2013).

Stubbe came to an early end not from chocolate but probably from riding while drunk. As a physician working in Warwick and Bath, he was answering a call to ride to Bristol in the evening. A contemporary biographer observed that he drowned in a shallow river, likely after his horse stumbled, "his head being then intoxicated with bibbing, but more with talking, and snuffing of Powder." He was forty-five, but had by then made many contributions to English polemical literature; most well known is his criticism of the Royal Society. Today historians remember him not for his treatise on chocolate but for a remarkably early defense of Islam, circulated in manuscript form and not published until 1911 (Wood 1690; Birchwood 2007).

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Sugar Bloom

See Fat Bloom on Chocolate

Sustainability

See Fair Trade Chocolate

Sylvestre Dufour, Philippe

See Dufour, Philippe Sylvestre

T

Tempering

Chocolate's unusual qualities have over the centuries made it a delight to consume but a bear to prepare. A peculiar tendency, uncommon in the world of plant-based fats, is cocoa butter's melting point. It is about 93°F or 34°C. Other common fats solid at around room temperature include butter, melting at around 32°C, coconut oil, 24°C, palm oil, 35°C, and shea butter, 32°C. We note those last two are both close to the melting temperature of cocoa butter. The low melting point is critical to the experience of chocolate, the pleasant sensation of a piece that melts in the mouth a few seconds after biting. That quality can be simulated by shea and palm, vegetable-based fats that cost manufacturers less than comparably pricey cocoa butter. Called cocoa butter equivalents (CBEs), they have been the focus of disagreement between chocolate companies and government regulators, particularly in Europe. CBEs do not, however, taste like cocoa butter and, if used at all, by regulation can only be present in small quantities (see **Cocoa Butter**).

Cocoa butter's distinctive melting point does not mean that after cooling it simply coalesces into the shiny bar with a nice snap we expect of good-quality chocolate. Nineteenth-century chocolate manufacturers who came up with a solid bar needed to find a way to overcome the tendency of solid chocolate to acquire a mottled appearance, often a whitish fat bloom, and an unappealing crumbly, soft texture that could easily break apart on handling. The answer was tempering the chocolate.

Chocolate melts easily but does not become solid by evaporation, as chocolate contains no water. In fact, it cannot contain water, one of the great frustrations of late-1800s chocolate makers such as Daniel Peter, who was trying to invent milk chocolate. Milk contains water. If even a drop of water is added to melted chocolate it will seize into grainy chunks suitable not even for the dogs (because chocolate is poisonous to them). In fact, the key to the appealing shiny surface and snappy break is based on controlled crystallization.

Three fats combine in cocoa butter: palmitic acid, stearic acid, and oleic acid. The ratio determines the melting point, but the crystal structure can be reset to bring up the form that manufacturers are aiming for. That form is called Form V, or beta, of six crystal forms found in chocolate. Because chocolate becomes solid by crystallization, and not by evaporation, the key to a fine chocolate bar is to encourage beta formation. Crystal forms in cocoa butter are reached at these temperatures (Library of Congress n.d.):

17°C, Form I, soft, crumbly

20°C, Form II, crumbly, melts easily

26°C, Form III, firm but melts easily

38°C, Form IV, firm, but melts easily

34°C, Form V, best; melts near body temperature, glossy, crisp bar

36°C, Form VI, very hard

The trick, then, is to heat the chocolate to the point where all the crystals melt, and then to cook it to the point where Form V recrystallizes to become the predominant form. Sometimes chocolate makers use the metaphor of a Lego structure or brick wall: all the pieces need to be the same size and linked for the structure to hold up.

Big chocolate manufacturers temper chocolate last, after conching, using large machines. But bean-to-bar chocolatiers and even cooks at home can temper it as well with a little practice and an accurate thermometer. To begin, a chocolate maker or pastry chef heats the mass (also called chocolate liquor) to fully melted, about 46°C (115°F). The chocolate can then cool to about 32°C (90°F), the “sweet spot” for Form V to recrystallize. While this works, holding the temperature at 32°C until enough Form V crystals gather typically takes too long. Chocolate makers usually lower the temperature to 27°C (81°F), promoting a faster formation of both Type V and Type IV, then raise it back up to 32°C to melt Form IV while leaving Form V (Kenji López-Alt 2019; *Cacao Magazine* 2020).

While this also works, manufacturers and pastry chefs often use a less laborious seeding method to encourage Form V. A quantity of tempered chocolate is added to the melted mass. This speeds Form V formation (Beckett 2000; *Cacao Magazine* 2020).

Chocolate that has lost its temper will signal the consumer with an unattractive whitish mottling and crumbly texture. It’s usually a result of chocolate that has gotten too warm. It is edible, though unappealing. But it can be brought back by retempering. In fact, chocolate can be retempered as often as necessary without affecting taste or consistency (*Cacao Magazine* 2020).

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Theobromine

See Caffeine/Theobromine

Tourism

As the popularity of fine chocolate produced by small manufacturers grew in the 1990s, so did opportunities for those who loved chocolate to find out more. “Bean-to-bar” producers often were happy to show curious customers their operations, unlike some big producers who considered their processes to be trade secrets. Seeing a growing interest in sustainable cacao production, some farmers in cacao-producing countries also opened their orchards to tourism.

By 2021, cocoa tourism had grown to offer multiple opportunities for exploration in nearly every country. The hundreds—probably thousands—of cocoa exploration options worldwide can generally be divided into three areas:

Growers: tours of cacao plantations and farms in the subtropical to tropical cacao belt that girds the earth from 20° N to 20° S of the equator

Manufacturers: people who turn cocoa beans into chocolate, from the world’s largest to the informal kitchens of small bean-to-bar operators

Educators: chocolate’s history and development based on displays and museum exhibits. Chocolate education programs designed to grow expertise for those who hope to be professional chocolatiers or hobbyists who just want to learn more about their passion

By 2021, many of these were combined into a single tourist experience. Cacao farms sometimes offered “tree-to-bar” tours that included hands-on opportunities to grind the beans and make the chocolate. Manufacturers, particularly large ones, combined tours of the process with displays covering cocoa history, art, culture, and entertainment, ending with large shops featuring chocolate products. Educational programs could lead to professional certifications or might be part of a manufacturer’s tour. Tasting classes could be aimed at professional pastry chefs and retailers or amateurs who just wanted to improve their palate. Some opportunities could be aimed at adults, others at children.

Chocolate begins with the cacao tree. Tourism companies, as well as farmers themselves, have discovered profit in opening their operations to visitors. The world’s largest cocoa-producing country, Ivory Coast, in 2021 offered cocoa features in several tours, including an eight-day expedition, the “Land of Cocoa Tour.” The tour operator described this trek as featuring a day of cocoa plantations around Daloa, “the heart of cocoa production” (Travel Côte d’Ivoire n.d.). Neighboring Ghana, the world’s second-largest cocoa-producing nation, featured Ghana Cocoa Tours, “The first tour company to focus solely on chocolate tours in Ghana” (Ghana Cocoa Tours n.d.).

While parts of Mexico and Guatemala are no longer titans of cocoa bean production, their chocolate history surpasses all rivals; it was here that chocolate originated, and from here that it reached Europe and the world. A British writer in 2018 asked, “Is Mexico the world’s best destination for chocolate lovers?” The answer seemed to be affirmative (Quinn 2018). Traditional Mexican chocolate-producing areas such as Tabasco and Soconusco offered tourists combinations of tastings, manufacturing, plantation tours, and Indigenous history. In Peru, where

the cacao tree originated, bean-to-bar workshops and tours of cacao and coffee plantations could be combined with visits to Cusco. Some tours in 2021 around Guayaquil, Ecuador, historically one of the world's great cacao regions, included opportunities for tourists to make their own chocolate on the farm. Caribbean nations have jumped on the opportunity to offer choco-tours. In St. Lucia, a Caribbean island hoping to revitalize cacao production, one tourist wrote on TripAdvisor, "Each of us on the tour got to graft our very own cocoa plant and tag it as our own. You can visit or email anytime and check on its progress" (2016 review in Viator 2021).

While some of the country-based cacao tour operators may come and go, general online tourist agencies typically feature several chocolate-leaning tours for any country able to produce the bean. This included in the United States, in Hawaii, the only state whose climate is reasonably able to support cacao orchards (Audley Travel n.d.).

Considering chocolate manufacturing, tourists will find the most elaborate tours to be featured in countries far away from the tropics. Most famous are run by the big-name chocolate multinationals that today dominate the market. In 2021, the top manufacturers all offered chocolate tours except one—Ferrero Rocher of Italy. In 2020, it ranked global number three for size but was well known for its manufacturing secrecy (Fitzpatrick 2016). At the other end of the scale was Hershey, probably the best-known purveyor of choco-love in the United States. Its Hershey's Chocolate World theme park in Hershey, Pennsylvania, offered a variety of demonstrations, tours, samples, and fun, oriented mostly toward children. Other Hershey's Chocolate World amusement centers drew tourists in New York City (Times Square), Las Vegas, Niagara Falls, and Singapore (Hershey n.d.).

Hershey in 2020 was the world's fifth-largest chocolate manufacturer after archrival Mars Wrigley at number one. Family-owned Mars in 2021 did not support a theme park or tourist attraction under its own name. It did, however, operate Ethel M Chocolates, "the best chocolate experience in Las Vegas," according to its website. Ethel M's history is somewhat of an oddity that reflects Mars family dynamics. After retiring as head of Mars, Forrest Mars Sr. became restless and so responded by setting up his own new chocolate brand named after his mother. Factory tours began in 1981, including free samples and an adjacent cactus botanical garden (Ethel M Chocolates n.d.; McConnell 2019).

In Europe, food giant Nestlé offered manufacturing tours of its Cailler chocolate brand in Broc, Switzerland, including cocoa history and unlimited free samples (McConnell 2019). Cadbury in the United Kingdom, one of the world's top chocolate producers, in 2021 part of Mondelez International (world's third largest chocolate manufacturer), featured Cadbury World near Birmingham. The kid-oriented theme park included hands-on demonstrations, stage shows, afternoon tea with chocolate, and Cadbury's largest candy store (Cadbury World n.d.).

Lindt and Sprüngli of Kilchberg, Switzerland, the world's seventh largest chocolate manufacturer in 2020, was not number one in business size, but its museum did feature the world's largest chocolate fountain. In 2020, Lindt's new 65,000-square-foot chocolate museum included a 30-foot-tall (9 m) chocolate

fountain depicting a golden whisk that dripped 1,500 liters of liquid chocolate into a giant facsimile of a Lindor truffle (Machemer 2020).

Meiji Co. of Japan, at world number five in 2020, was not as well known to European and American consumers. But its manufacturing headquarters in Takatsuki, Japan, also welcomed choco-tourists. Visitors by train could find the right station by spotting the factory's wall-sized bar of chocolate (Duck 2019).

These gigantic testaments to the wealth and power in chocolate may include educational exhibits. But the world's private and public cacao and chocolate museums focus on a more specific mission, to highlight a theme of chocolate knowledge. Well-known museums in 2021 included the Musée du Cacao et du Chocolat, Brussels; Choco-Story, Bruges and Paris; Schokoladenmuseum, Cologne; Museo del Cioccolato Antica Norba, near Rome; ChocoMuseo, Lima; Museu de la Xocolata, Barcelona; and the World of Chocolate Museum and Café, Orlando, Florida.

A few hours may be enough to visit a museum for chocolate insight. More serious chocolate connoisseurs may wish to enroll in a class or entire instructional program. One well-known school for professionals, the online Ecole Chocolat, in 2021 offered students instruction to make their own "fabulous chocolate" and develop recipes. While the school, established by Vancouver chocolatier Pam Williams in 1981, was geared to professionals, website promotion indicated an opportunity for hobbyists to explore chocolate as well (Ecole Chocolat 2021). Another option, the Chocolate Alliance Cocoa Academy, in 2021, featured its "pro series" webinars covering topics including business, kitchens, tempering, making chocolate, sugar science, cacao fermentation, drying machines and equipment, and sensory analysis (Chocolate Alliance 2021). In a 2018 magazine feature exploring how to become a professional chocolatier, however, Godiva executive chef chocolatier Thierry Muret recommended that serious students of chocolate should complete full culinary school training as a pastry chef (Kramer 2018).

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Trinitario

See Criollo



Van Houten, Coenraad Johannes and Caspardus

As the nineteenth century began, chocolate was still a food nearly always consumed as a beverage. The cocoa butter, a fat that typically makes up about half of a cocoa bean, did not mix well in liquid and so tended to float to the top. It could be skimmed, or it could be kept suspended by vigorous stirring. Most affluent European homes kept their own *chocolatière*, a pot with a hole in the top for a stirring whisk, or *molinillo*. Some manufacturers, particularly in Britain, added starches to soak up the fat. Many English chocolate drinkers came to prefer the thick beverage produced by that method (Cadbury 2010).

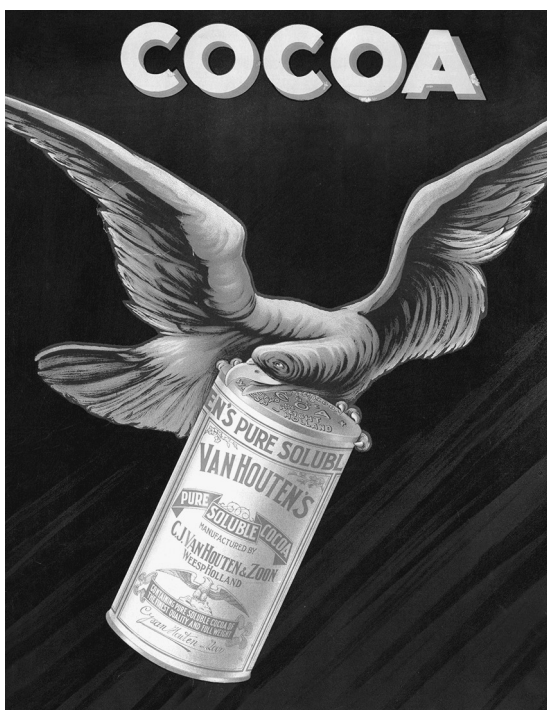
In addition to its somewhat unappealing fat content, chocolate's high acidity produced a characteristic bitter and astringent taste that put off some consumers. The taste could be attenuated depending on quality of beans and processing, or by adding sugar, vanilla, and other flavorings. But it could not be eliminated.

That is, until a Dutch family turned attention to the challenge. The solutions revolutionized chocolate manufacturing. Most chocolate by the end of the century had little in common with that of the beginning.

Historical examinations of the Van Houten family sometimes show confusion regarding who should be given credit for the inventions that changed the face of chocolate manufacturing. Coenraad often overshadows his father, Caspardus. However, it seems likely that the elder Van Houten, and not Coenraad, in 1828 patented the hydraulic press capable of extracting about half the fat from the cocoa bean—from about 50 to about 25 percent or less. A timeline produced by Barry Callebaut, a multinational cacao processor that acquired Van Houten Chocolate in 1998, seemed to firmly establish credit, stating that Caspardus invented the press in 1828. The elder Van Houten had offered chocolate at his Amsterdam coffee and spice shop since 1815. However, the timeline also indicated that Coenraad entered the company three years before the patent, in 1825. Perhaps the most reasonable conclusion based on the evidence is that Caspardus invented the press, but Coenraad played some role (Van Houten n.d.).

In any case, the cocoa press dramatically changed chocolate by pressing out enough cocoa butter to leave a dry cake. This could be ground into powder to produce a drink that would no longer include the unappealing globules of floating cocoa butter. Not only were the old-fashioned chocolate pots with stirring rods destined to become obsolete but also the added starches were no longer necessary.

Van Houten's process was actually not new. French publications in the earlier century occasionally referred to a pressing process, possibly using a cider-style press. And chocolate makers knew that if they hung the chocolate liquor in a warm



Van Houten Cocoa advertising card published about 1890. Dutch chocolatiers Caspardus and Coenraad Van Houten revolutionized chocolate manufacturing in two ways to help turn a fairly expensive elite product into a huge commercial success. Their alkalizing (“Dutching”) process gave the public a more appealing cocoa that was darker and less bitter. Their chocolate press removed enough cocoa butter to turn cocoa into a powder. This made possible the invention of edible chocolate in bar form. (Library of Congress)

room, cocoa butter would drip out on its own. In the nineteenth-century, Ghirardelli in San Francisco sold a cocoa defatted in this way that it called Broma. But Van Houten made the processes fast and efficient (Grivetti and Shapiro 2009; Gordon 2007).

Still an objection to some was the typical bitterness of chocolate. In 1845, Coenraad Van Houten’s patent responded with a process that apparently had been used by Indigenous peoples of the New World centuries earlier. Native peoples tried to reduce acidity with wood ashes. Europeans tried to mask it with sugar, apparently not aware of or interested in the native experiments. But ash is alkaline, and Van Houten realized that alkali in another form could counteract the acidity of chocolate. The Van Houten process added an alkali to the beans during roasting (see **Alkali**). The process not only reduced the bitterness but also darkened the powder and gave it an ability to emulsify in water more easily. The result was a milder, darker, easier-to-

prepare chocolate drink from a bean already defatted from the press. Van Houten called it cocoa powder. The alkali treatment became known as the Dutch process, or Dutching, based on the country of its origin (Van Houten n.d.).

The Van Houten company grew successful on its two unique patents. As Van Houten’s Dutched drinking chocolate spread beyond Holland, competitors took note. French chocolate producers were quick to buy the new presses. In Britain, however, the big firms like Cadbury and Fry continued to produce drinking chocolate the old way, adding starches that British consumers seemed to prefer (Wagner 1987; Oddy and Miller 1976). But in 1861, George Cadbury saw an evolution in British tastes. A growing British pure food movement targeted adulterations in common foods, including starches in chocolate. Cadbury traveled to Amsterdam, where he persuaded Van Houten to sell him a press. Cadbury subsequently produced a new powder that he called “Cocoa Essence,” advertising it as “Absolutely Pure, Therefore Best” (Cadbury 2010). It contained no flour or other starches.

Cadbury's aggressive marketing annoyed rivals such as J. S. Fry, who believed the added starches were not adulterations, and in fact made the product more palatable (Grivetti and Shapiro 2009). It was a battle that Fry was destined to lose, but the British rival had another idea that in the long run would change the way people consumed chocolate. Fry used the defatted cocoa powder in experiments to produce a new product. The company returned some of the cocoa butter to the chocolate liquor (also called chocolate mass), blending it with sugar to make a paste. This was pressed into a mold. The result: the first true chocolate bar. It would become the rage of Britain and elsewhere, and raise Fry & Sons into becoming the largest chocolate manufacturer in the world (Cadbury 2010; Coe and Coe 1996).

As much as Cadbury was persuaded by Van Houten's defatting press, he was less persuaded by the Dutching process. In fact, he considered the alkali-treated cocoa powder to be an adulteration that could not be marketed as pure, although no alkali remains in the final product. He waged an aggressive campaign against Van Houten's cocoa powder, declaring that alkali salts were injurious and pressing British medical authorities to agree. In 1890, he persuaded the *Birmingham Medical Review* to declare that the Dutch process compromised health (Cadbury 2010).

None of this mattered to the public, either in Britain or elsewhere. People liked Van Houten's Dutch process cocoa. In 1908, Cadbury finally responded to consumer demand, and falling sales, by introducing a new powder, Bournville Cocoa. It was manufactured using the Dutch process. In 2021, the Bournville brand was still available, although Cadbury was now part of the multinational Mondelez. Its ingredient list did not say it was alkalized. Instead, it stated, "acidity regulator (sodium carbonate)." Van Houten's cocoa powder in 2021 also described its Dutching as "acidity regulator: potassium carbonates." Droste of Holland, in 2021 owned by Hosta Group of Germany, described its powder simply as "Dutch processed." Ghirardelli, in 2021 owned by Lindt & Sprüngli of Switzerland, described its cocoa powder as "Cocoa processed with alkali." Hershey's 100 percent unsweetened cocoa powder was not alkalized, but its Special Dark 100 percent cacao was described as "Dutched cocoa."

By the late 1800s, most major chocolate manufacturers had acquired cocoa presses, often steam-operated. In the United States, Walter Baker Co., at the time the country's largest chocolate manufacturer, acquired a press in 1890 (Grivetti and Shapiro 2009).

Dutched chocolate is reserved mostly for powders, the popular choice for hot chocolate and baking. Fine-chocolate makers today consider Fry's process of defatting cocoa and then reintroducing it in bar form to be of inferior quality, used only for mass-market chocolate (Gordon 2007).

Van Houten's "cocoa powder" left the world in more confusion regarding what to call the product from the cacao tree. Is it cacao, cocoa, or chocolate? The industry has taken up the word "cocoa" to mean the worldwide industry, the cocoa sector. Manufacturers, pastry chefs, and consumers sometimes use the terms "cocoa" and "chocolate" synonymously. To help clarify, we can consider the tree, and its seed, to be cacao until it has been fermented and so is no longer viable. Then it becomes a bean, the cocoa bean. Crushed it becomes cocoa nibs. When further processing turns the bean into an edible product, however, it becomes one of three

things: if it is in powder form, it is cocoa powder, as Van Houten called it. If it is the fat only, it is cocoa butter. In other forms, it is chocolate.

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Vegan Chocolate

Chocolate is by definition vegan. It is a totally plant-based product, collected from a pod produced on a tree. Artisanal chocolate and bean-to-bar makers often market a "two-ingredient" product as the purist form of chocolate. The bars contain chocolate liquor (also called cocoa mass) and sugar or another sweetener. No dairy products. No meat, unless one counts insects; the U.S. Food and Drug Administration allows up to sixty bug parts per 100 grams (see **Adulteration**). Insect fragments may be found in most foods, as they are impossible to completely remove.

Chocolate purists may favor bean-to-bar products crafted with love in small kitchens. But most people are not chocolate purists. And the style of chocolate that has driven a mighty global industry for more than a century is milk chocolate. Casual consumers often prefer the milder and creamier taste of milk chocolate, either alone or as part of a wide variety of flavored bars and bonbons. The world's most iconic chocolate confections—Hershey Bar, Dairy Milk, M&M's, KitKat, Crunch—begin with milk chocolate. Search a favorite convenience store candy bar rack. You will be hard-pressed to find a chocolate bar that does not contain milk.

Milk chocolate continues to drive the global chocolate industry, but in recent years producers have seen some growth among consumers who are looking for something different. They do not want to give up their favorite chocolate. They do want to give up dairy products. Industry observers noted one of the trends accelerated by the 2020 pandemic saw more consumers looking for supposedly healthier dairy-free chocolate (Myers 2021).

Multinational producer Barry Callebaut jumped on the trend with a new line of dairy-free products in 2020 that it called Plant Craft. It explained, "The next generation of consumers is looking for experiences that are tasty, good for them and

good for the planet. With that in mind, we aim to accompany the industry in this plant-based revolution” (Barry Callebaut n.d.). Products include its “Milk Chocolate,” described as having “typical creaminess and flavor that consumers love about milk chocolate, plant-based.” The substitute ingredient, explained the company, was “exclusively available to Barry Callebaut.” It was not identified.

Ritter Sport, a large German chocolate manufacturer with a worldwide reach, also in 2021 featured a line of vegan bars. The three varieties were prominently labeled “vegan,” with a “V” design (Ritter Sport n.d.). Some manufacturers have tried to match the taste of milk chocolate with an almond milk substitute. Taza Chocolate, a large U.S.-based chocolate manufacturer, promotes “almond milk” chocolate, listing in its ingredients almond flour. In 2020, the U.S. grocery store chain Trader Joe’s launched a vegan “milk chocolate” bar it called Organic Almond Beverage Chocolate Bar. “Our customers are asking for vegan items,” explained Nadler Guerette, category manager for candy, cookies, and cereal (Smith 2020). Love Cocoa, a fine-chocolate company launched in Britain by James Cadbury, a descendent of Cadbury’s original owners, in 2016 introduced its Avocado 71 percent Dark Chocolate Bar, sold as “vegan-friendly.” It is one of seven Love Cocoa dark chocolate varieties marketed as vegan (Love Cocoa 2021). Sometimes vegan producers identify their products by spelling milk “mylk.”

The cocoa sector’s “big five,” Mars Wrigley, Ferrero Rocher, Mondeléz, Meiji, and Hershey, do not market vegan chocolate. However, mass-market chocolate companies may offer vegan chocolate despite disinterest in promoting the style. Lindt, for example, the world’s seventh largest, markets a variety of dark chocolate bars that do not contain milk. Many other familiar brand names sell vegan chocolate products including Ghirardelli, Godiva, Hu, Theo, and Tony’s Chocolonely.

It is not only the ingredients, however, that determine vegan authenticity for some consumers. Those who do not eat dairy products based on an allergy or lactose intolerance may need to search further for a chocolate product that is fully safe. The ingredient phrase “may contain milk” or dairy products indicates that the chocolate is produced using the same equipment or at the same factory that uses milk (or other allergens) in its production. Severe allergy sufferers may need to consider the risk, although seldom is dairy actually present (McFarland n.d.). Nevertheless, Barry Callebaut in 2021 was expected to complete a new factory in Germany built expressly to avoid possible milk contamination in its vegan products. A concern is milk powder that can spread throughout a factory over pipes and air handling systems (Myers 2020). Products labeled lactose-free signal consumers who are lactose intolerant. But lactose can be removed from a product that still contains dairy, so are not necessarily vegan.

Some vegans show concern about the common chocolate additive lecithin. The vegetable-based fat is normally added to reduce the viscosity of the chocolate and increase ease of tempering. This simplifies production in larger plants and sometimes is used as a cheaper substitute to cocoa butter. Lecithin is vegan-friendly, usually extracted from soybeans. Critics, however, say that it changes the taste of the chocolate to become more waxy and less fragrant. Lecithin is also alleged to be part of a highly chemical-based manufacturing process, although the lecithin used in chocolate is more lightly processed (Terenzi 2018; Tromba 2019). The Fine

Chocolate Industry Association, in its list of acceptable ingredients for fine chocolate, includes lecithin (Fine Chocolate Industry Association 2021).

Beyond chocolate, lecithin is widely prescribed as a safe medication for a variety of complaints, is used in preparation of other medications, and as a skin moisturizer. Artisan or bean-to-bar manufacturers generally avoid lecithin, as discerning consumers gravitate toward products listing fewer unfamiliar substances on an ingredients label. Some fine-chocolate makers do use lecithin to maintain a consistent flavor profile and resist fat bloom. Large manufacturers can save substantial amounts by substituting lecithin for even a small amount of cocoa butter. Substituting for just 4 percent of cocoa butter in 1,000 tons of chocolate, the savings will be around \$100,000 (Tromba 2019).

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W

White Chocolate

For most of its history, chocolate meant only one thing: dark chocolate. It could contain a variety of additives, and usually did, but at base the processed and ground cocoa bean defined chocolate.

In the 1870s, Daniel Peter in Switzerland perfected a second style of chocolate based on the addition of powdered or condensed milk. The world now had two chocolate styles. Popularity of milk chocolate grew rapidly in the twentieth century to overshadow the older style.

A third variety, white chocolate, arrived more recently, and has been more controversial. In 1930, Nestlé's chemists, presumably working in its sprawling Fulton, New York, factory (some sources say in Switzerland), managed to remove from the mass every last gram of cocoa solids. What was left was pure cocoa butter, off-white in color, as it contained no actual cocoa. Nestlé added sugar and milk and called it "white chocolate." In 1936, Nestlé began to market a white chocolate bar it called Galak in South America, Milkybar in Britain. In 1948, Nestlé introduced another, Alpine White. The company discontinued it in the early 1990s, much to the consternation of diehard aficionados who took to social media with a Facebook page in hopes the Swiss multinational would bring it back.

But nagging questions remained. One, can a substance rendered from the cocoa bean containing no cocoa solids, and tasting nothing like chocolate, accurately be called chocolate? And two, did Nestlé really invent it?

By 1930, Van Houten's press had been extracting cocoa butter for more than a century. In 1847, J. S. Fry used some of the extracted butter in its formula for the first successful chocolate bar. Cocoa butter is solid at room temperature, as is chocolate. Did no one consider keeping the butter out to produce a confection on its own? Perhaps someone did, but evidence is scant. A historian examining the question (Wassberg 2021) discovered a nineteenth-century pharmacy book of formulas containing a recipe that did, indeed, resemble white chocolate: "White sugar, 3 lb., rice flour, 27 1/2 oz., English or Indian arrow-root, 8 oz., tincture of vanilla, 1/2 oz., butter of cacao, 8 oz., powdered gum arabic, 4 oz.; form a paste with boiling water, and put it into molds" (Beasley 1871, 281).

No cocoa solids are listed, only cocoa butter. But this would have been used as a medicine, not as a confection. The Zero Bar, a white bar that resembled chocolate in consistency, was introduced by a Minneapolis, Minnesota, manufacturer about 1920, and in 2021 was still produced by Hershey Company. However, the 2021 ingredient list did not include cocoa butter. In fact, it did not contain chocolate at all. Another possible pioneer, the Milka bar, was a white bar that also resembled chocolate in consistency. It was introduced by a German manufacturer

in 1901, in 2021 still produced as part of Mondeléz brands. The ingredient list for that product did include “cocoa butter” as the second ingredient (after sugar), but also included “cocoa mass,” so was not white chocolate; all cocoa mass contains cocoa butter.

At this point it appears that we can reliably trace the earliest white chocolate confection to 1936 with Nestlé's Galak and Milkybar. Ingredient lists in 2021 for both indicated cocoa butter as second or third ingredient, and no cocoa solids. Another mass-market white chocolate bar, Lindt Classic Recipe White, identified cocoa butter as its second ingredient, and no cocoa solids.

All white chocolate bars and couvertures (for pastry chefs) include sugar and milk. This reduces preserving qualities, as the antioxidants that inhibit decomposition of milk fat are mostly in the cocoa solids (Beckett 2000). It also tends to melt more quickly. Some manufacturers have added ingredients to counteract its flaws. The Milkybar did indeed include cocoa butter. In addition to sugar and milk, its ingredient list also included mango kernel, palm, sal and shea oils, and lecithin. Is this kind of thing really chocolate?

For decades the U.S. Food and Drug Administration said no. U.S. manufacturers were required to call it “white confectionary coating.” That changed in 2004, based on confectionary industry lobbying. The FDA regulation in 2020 required that “white chocolate” must contain “not less than 20% by weight of cacao fat” and “not more than 55% by weight of nutritive carbohydrate sweetener,” that is, sugar. EU standard in Europe also required 20 percent cocoa butter but included no maximum on sugar (FDA 2019; EU 2000). The Fine Chocolate Industry Association defined acceptable white chocolate as containing sugar, cacao butter, milk solids, milk fat, lecithin, vanilla. No proportions were indicated.

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White's Chocolate House (London)

Sometimes called London's most exclusive club, White's of St. James's Street began in 1693 as White's Chocolate House. Historians are uncertain if chocolate was actually served there. Certainly, it served ale and beer, snacks, and

coffee. It was a somewhat late entry to the craze of coffee and chocolate houses established in London after the new and exotic beverages became popular in Europe. Coffee and chocolate reached England at about the same time. These two new beverages, along with a third, tea, must have been served in most of these new venues. But evidence that chocolate really was served at White's can be taken from references indicating that Londoners called its proprietor "The Chocolatt Man in St. James' street" (John Soane's Museum Collection 1787). White's opened under the namesake of its founder, Francesco Bianchi, an Italian immigrant, probably from Genoa. In London, he anglicized his name to Francis White (John Soane's Museum Collection 1787; Grivetti and Shapiro 2009).

It was not so much the namesake beverage at White's that has made it a British institution. It was its importance as a home of political discussion that came to attract some of the most important men in Britain. Coffee and chocolate houses at this time served as more than locales for a quick drink. They became centers for business transactions, political debates, exchange of news, and, at the less savory edges, gaming and prostitution (Loveman 2013). The dark side of White's became famous based on a set of paintings by William Hogarth in *The Rake's Progress* (c. 1733) that show supposed depravity of what was depicted in effect as little more than a gambling den (Loveman 2013).

On the positive side, in an early history of White's, Bourke argued that the club in the eighteenth century had become a powerful hub of influence for Britain's political and business leaders. Coffee and chocolate houses, he argued, "were the only means for the expression of public opinion," much of it hostile to the monarchy. "The government soon took alarm at this new power," and so the king issued a proclamation suppressing coffee and chocolate houses. After an outcry it was not enforced (Bourke 1892, 3). Men of influence who spent time at White's included every prime minister of the eighteenth century, most of their colleagues, military leaders, and others "who have executed the schemes of those statesmen in all parts of the world" (Bourke 1892, xiii).

An exclusive club, observed Bourke, was not originally White's aim. It was at the beginning open to everyone at small expense (one penny). But as those from the higher classes disdained hobnobbing with the common and possibly unsavory, they organized into private clubs that retired to one of White's meeting rooms and allowed no others to enter. Realizing it would be more lucrative to serve this group than the general public, White's eventually transformed itself into an exclusive London gentleman's club.

The 1674 town house (later rebuilt) that White's occupied in 2021 became its home in 1755. Even then it was already acknowledged to be the oldest club in London's West End still in existence (John Soane's Museum Collection 1787). The club in 2021 still attracted the country's royalty and politically powerful but has come under criticism for famously refusing to admit women. In 2008, Prime Minister David Cameron resigned his membership purportedly over the issue. But as of 2020, London's most exclusive original chocolate house stuck to its policy, with a single exception: Queen Elizabeth II.

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Xocolatl

See Chocolat, Chocolate, Xocolatl

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